SPECIAL REPORT: HOW TO FAKE AN 'ALIEN' • MARTIN GARDNER ON POST-FREUDIAN DREAM THEORY

# Skeptical Inquirer

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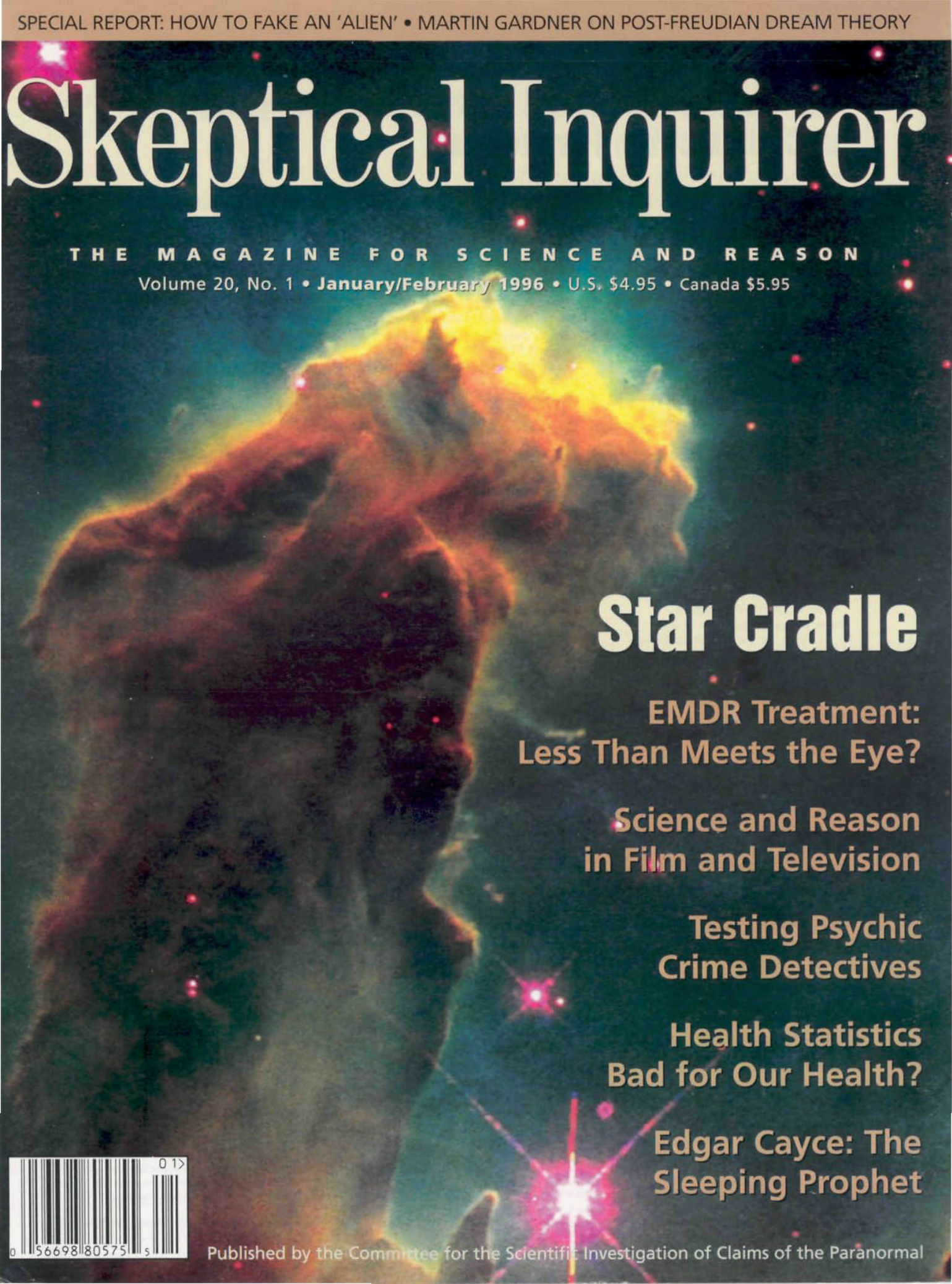

## Star Cradle

EMDR Treatment: Less Than Meets the Eye?

Science and Reason in Film and Television

Testing Psychic Crime Detectives

Health Statistics Bad for Our Health?

Edgar Cayce: The Sleeping Prophet

Published by the Committee for the Scientific Investigation of Claims of the Paranormal

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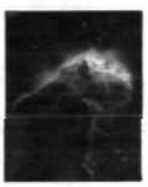

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*Photo from the Hubble Space Telescope.*
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# EDITOR'S NOTE

## *Explorers of the Boundary*

Recently the scholarly journal *Public Understanding of Science,* published in Bristol, England, by IOP (Institute of Physics) Publishing and The Science Museum, printed a thoughtful review (4:321, 1995) of the SKEPTICAL INQUIRER. I want to share with you some of the comments.

"The public understanding of science is about the Boundary. The Boundary separates 'The Scientific' from 'Everything Else.' For many members of the scientific community, inside the Boundary is a sanctuary of sanity and reason; outside, there be monsters. Public understanding of science researchers with this outlook might set out, checklist in hand, to ascertain just how monstrous it is out there. And they might carry with them, by way of a guide to the territory, a copy of SKEPTICAL INQUIRER. . . ." The reviewer goes on to describe us in some detail, saying:

"Coverage on the first 18 years of *SI* ranges widely across the territory of 'fringe,' 'pseudo,' and 'antiscientific' beliefs. . . . Called a journal, in some ways more a magazine, *SI* is a sort of 'new nonscientist *New Scientist*. . . .'" The reviewer then describes the types of material we publish in each issue.

"The sum of these parts is an unrivaled source of information about life outside the Boundary, making *SI* an indispensable resource for anyone involved in virtually any aspect of public understanding of science. Whether for teaching or research, *SI* should be on your reading list. Those involved in the philosophy and sociology of science will find it useful, too. And if you're seriously concerned with just how weird it is out there, *SI* is definitely for you.

"It's fun to read, too—and not just because it is often entertainingly written. Some of us researching the public understanding of science are less concerned about maintaining the Boundary than in observing the sallies against it and the means of attack and defence. For this, *SI* is enormously valuable, for here is the common sense of the scientific community on display."

We thank Simon Locke, School of Social Science, Kingston University, U.K., for these kind words. And we are not unmindful of some criticism he also offers. Locke criticizes CSICOP and *SI* for nonskeptically assuming the existence of the Boundary. He also says we self-assert the role of policing it (really, we didn't devise our name so it had "cop" in it). By doing so, he says, "they effectively rule out the capacity of the nonscientific public to question science. Any such questioning tends to be looked upon as either misunderstanding or rejection."

I hope he's not right about that. Science should be questioned just like everything else. If anything, I think we've championed the role for nonscientists to be involved in skeptical thinking. And if scientists really see themselves as functioning behind castlelike barricades (and I agree many do), we have promoted the need for them to get outside those walls and interact with the public out there in nonscience-land.

"The Boundary" is Professor Locke's own metaphor. I myself see the "boundary" between science and pseudoscience in less stark terms. It's gray, and fuzzy, and undefined, and laypersons and scientists alike traverse it all the time. Some people seem to live partly on each side at the same time. Some get caught there and stay long periods; some comfortably so, others not. But one thing to which I'll agree: It's a fascinating place to explore. And that's what we'll keep doing.

Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON



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# Psychics Missed It Big (Again) in 1995

Rush Limbaugh will be forced to go on welfare, Peter Jennings will become the first journalist in space, and Disney World will be wiped out by a hurricane.

Those were the forecasts that were supposed to come true in 1995, according to the top psychics who publish their prognostications in the supermarket tabloids such as the *National Enquirer,* the *National Examiner* and *Weekly World News.*

As always, there were the typical forecasts: of celebrities taking new occupations (psychic Shawn Robbins said Hugh Hefner will give up his Playboy empire and become a sunflower cultivator); promises of cures for AIDS and Alzheimer's disease; and predictions that space aliens would be discovered.

Also, there was the usual crop of vague predictions that left plenty of wiggle room in case they didn't come true.

In the December 13, 1994, issue of the *Globe,* for example, Mystic Meg forecast that Liz Taylor "will stumble across a formula that *could* [emphasis added] spell an AIDS breakthrough." Jeane Dixon said, "A scandal in a religious cult *could* [emphasis added] lead to murder, suicides, and a doomsday vigil in the spring."

Most of the psychics in the tabloids aren't shy about forecasting unexpected events guaranteed to make headlines (if they came true). Here are some of the predictions that were supposed to come true in 1995.

The *National Enquirer*'s stable of psychics, in the tabloid's January 10 and June 20, 1995, issues, predicted that:

• Socks the cat will be kidnapped and held for $1,000 ransom by a homeless driver who is captured after he also tries to snatch Vice President Albert Gore's poodle.

• Peter Jennings will do the evening news from orbit aboard the Space Shuttle.

• "A child genius will stun judges at a 7th-grade science fair when he presents a working time machine" made from parts of a microwave oven.

• "Scientists will discover a beneficial virus that can turn ordinary rocks into a protein-rich food. And some experts will predict the find will lead to the end of world hunger."

• Tonya Harding will be "denied permission to open the nation's first all-nude ice skating rink."

The *National Examiner*'s top psychics said 1995 would be the year that:

• President Clinton is shot in the jaw by a disgruntled postal worker.

• "A meteor the size of a Buick will strike a used car dealership in Las Vegas. No one will be injured in the crash, but the crater will open up a vast underground reservoir of drinking water, solving the desert town's water shortage."

• Basketball player Shaquille O'Neal quits basketball to become Rookie of the Year in baseball.

• Michael Jackson's "already weakened schnozz" will "permanently collapse" after an outraged mom punches him in the nose during a public appearance.

• Rush Limbaugh will "lose his fortune and become destitute. Forced on welfare, Rush will become a Democrat."

The psychics at *Weekly World News* predicted that in 1995 a volcanic eruption would create a new land mass that ties the United States to Cuba; frog legs would become the rage in fast-food restaurants; and scientists would discover rapidly mutating bees, uncovering evidence "that the insects are developing an intelligence that might one day rival that of men."

Dixon, one of the country's best known psychics, in the July 25, 1995, issue of the *Star* forecast "a stunning outcome to the O. J. Simpson trial will bring a result no one predicted. I can see that O.J. will walk."

She was right. But Dixon could just as easily claim success if Simpson had been found guilty or the jury had failed to reach a decision.

"A guilty verdict or hung jury will keep O. J. Simpson in jail through most

## A Typical Aries?

One of America's best-known astrologers, Linda Goodman, died on Saturday, October 21, 1995. An itinerant newspaper and radio writer, she adopted her pseudonymous first name after a stint on radio reading "Letters from Linda." Her surname was that of her second husband, Sam Goodman.

Goodman's interest in astrology came from supermarket booklets, and her own books took advantage of the extreme popularity of the subject in America.

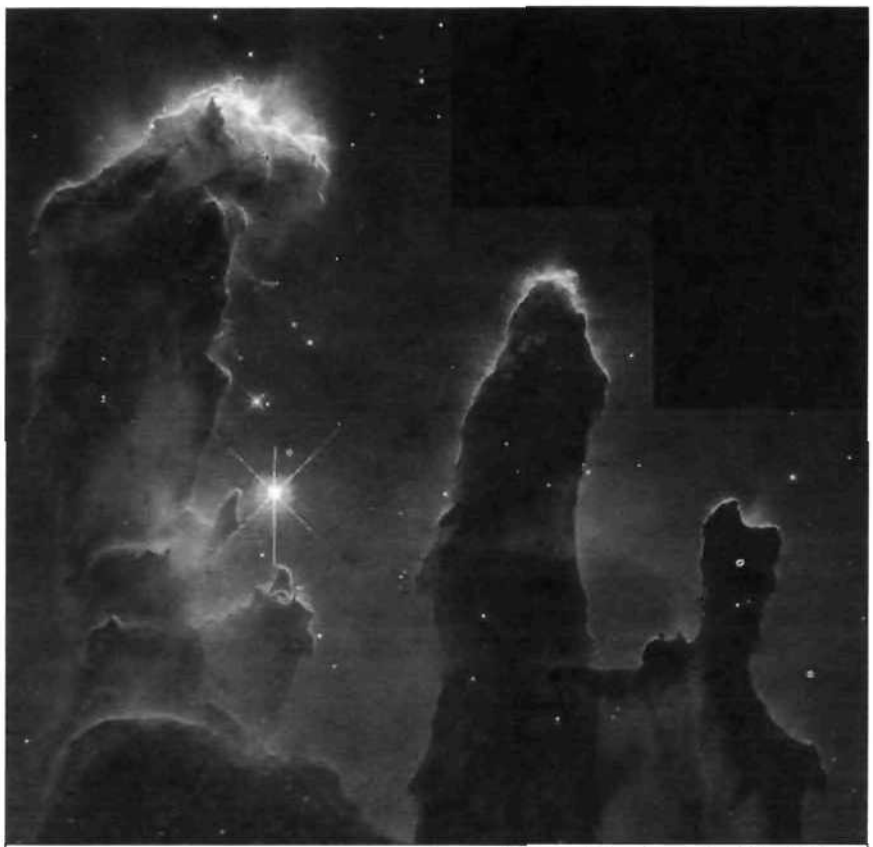
In 1968, Goodman's *Sun Signs* became the first book on the topic to make the *New York Times* best-seller list, and she received $2.3 million for the paperback rights alone. In time, she became even more mystical and incorporated into her books numerology as well as reincarnation.

When her 18-year-old daughter Sarah committed suicide in 1973, Goodman's reaction was to refuse to believe that the body her husband had identified was actually Sarah's, citing as "evidence" her daughter's horoscope. Instead, she embarked on a search for the "missing" teenager, squandering her money, and (according to her obituary in the October 25, 1995, *New York Times),* "living for several months on the steps of St. Patrick's Cathedral."

According to the *Times,* Goodman was born Mary Alice Kemery (*sic*) in Morgantown, West Virginia, "on a date she gave as April 19 in a year she would never disclose"—not even to her son. This secrecy prompted a minor *SI* investigation. Actually, according to the Monongalia County, West Virginia, Register and Index of Births, she was Mary Alice *Kenery,* a daughter of Robert S. and Mazy A. (McBee) Kenery. She was born in 1925 (the *Times* had guessed she was "about 70") but not on the day she alleged. The register lists her birth as April 10, nine days earlier than Goodman always claimed. Therefore, from an astrological point of view her horoscope would have been significantly different than she represented it (although it is not certain that this was a deliberate falsification on her part).

In any case, her forecast for the day of her death (as given in Jeane Dixon's syndicated *Horoscope* column) read, in part: "A change of scenery will help you put recent events in proper perspective."

—*Joe Nickell*



J. Hester and P. Scowen (Arizona State University), and NASA. Courtesy, Space Telescope Science Institute, Baltimore.

## New Eye on Nature: Cradles of (Star) Creation

This spectacular Hubble Space Telescope photo (also on our cover) reveals gaseous pillars in the M16 nebula that are incubators of new stars. The pillars of cool molecular hydrogen gas and dust protrude from the interior wall of a dark molecular cloud. The new stars are embedded inside fingerlike protrusions extending from the top of the nebula. Each "fingertip" is somewhat larger than our solar system.

The pillars, each about a light-year (6 trillion miles) long, are especially dense clouds of gas and dust that have survived longer than their surroundings—like buttes sculpted by differential erosion—in the face of intense ultraviolet light from nearby stars. The ultraviolet light heats the gas and boils it away in a process called photoevaporation. These new photos reveal how photoevaporation contributes to the process of creating new stars and controlling their size.

As the pillars themselves are eroded away by the ultraviolet light, small globules of even denser gas buried within them are revealed. These globules have been aptly dubbed "EGGs," for "evaporating gaseous globules." Forming within at least some of the EGGs are embryonic stars—stars that abruptly stop growing when the EGGs are uncovered and separated from the larger reservoir of gas from which they were drawing mass. Eventually, the stars emerge from the EGGs and the EGGs themselves succumb to photoevaporation.

"For a long time astronomers have speculated about what processes control the sizes of stars—about why stars are the sizes that they are," says Jeff Hester of Arizona State University. "Now in M16 we seem to be watching at least one such process at work right in front of our eyes." He says, "We were just blown away" when seeing the pictures for the first time.

By stringing together a series of these pictures of EGGs caught at different stages of being uncovered, Hester and colleagues are getting an unprecedented look at what stars and their surroundings look like before they are truly stars. "This is the first time that we have actually seen the process of forming stars being uncovered by photoevaporation," he says.

The star-forming region is 7,000 light-years away in the Eagle nebula (M16), in the constellation Serpens. This picture was taken by Hubble's Wide Field and Planetary camera April 1, 1995, and issued by NASA November 2, 1995.

of this year," she predicted in the January 17, 1995, issue of the *Star.* "I don't see him walking away a free man until an appeal," Dixon predicted in the April 25, 1995, issue of the tabloid. And in the October 10, 1995, issue, published after the verdict, Dixon predicted that "O.J. will be released from jail, but there will be a second trial and he will be incarcerated at least one more year."

Sometimes the predictions are laughable because they reflect so little knowledge of the real world, such as when psychics predict that someone will be elected president during the years when a presidential election isn't scheduled.

Dixon falls into that category with her prediction in the January 17, 1995, issue of the *Star,* saying, "A new, antibiotic-resistant strain of influenza causes coast-to-coast misery in early winter and again in early spring. Scientists will trace the virus to polluted water." It's not surprising. Antibiotics don't work on viruses, which is why you don't prescribe them for the common cold, flu, AIDS, etc.

Unfortunately, the psychics gave no warning of the Oklahoma City bombing, the events surrounding the Unabomber, or of Christopher "Superman" Reeve's tragic accident.

As for 1996, it's supposed to be the year Hawaii sinks into the ocean, banana peels are found to cure cancer, global temperatures plummet 35 degrees, the Grand Canyon is closed to tourists after the federal government decides to use the area as a nuclear waste dump, and all the athletes in the '96 Olympics are forced to undergo species tests—after officials learn that a woman who won the gold medal in the shot put is really a girl gorilla.

*—C. Eugene Emery, Jr.*

*Gene Emery is the science writer for the* Providence Journal-Bulletin, *75 Fountain Street, Providence, RI 02902. SKEPTICAL INQUIRER readers can encourage their favorite psychics to send him their forecasts of events that will make national or international news in 1996.*

# Post-Freudian Dream Theory

*Dreams have a kind of hellish ingenuity and energy in the pursuit of the inappropriate; the most omniscient and cunning artist never took so much trouble or achieved such success in finding exactly the word that was right or exactly the action that was significant, as this midnight lord of misrule can do in finding exactly the word that is wrong and exactly the action that is meaningless.*

—G. K. Chesterton, in
*The Coloured Lands*

The dream theories of Sigmund Freud and Carl Jung were subjective speculations almost totally without empirical support. Not until 1952 was there a major breakthrough in laboratory investigations of dreams. That was the year Eugene Aserinsky, a graduate student in physiology at the University of Chicago, accidently discovered REM, the Rapid Eye Movements that accompany deep-sleep dreaming.

Aserinsky had attached electrodes near the eyes of his sleeping 10-year-old son Armond. He was surprised to see that the EEG (electroencephalogram) machine was tracing wide swings on its graph paper. Further research by Aserinsky and Nathaniel Kleitman, director of the university's sleep research, made the great discovery that periods of REM were signs of vivid dreaming in contrast to the feeble dreams of NREM (non-REM) sleep.

REM sleep, it soon became apparent, occurs in intervals throughout the night, usually four to six times, each lasting from ten minutes to an hour. Subjects who believed they dreamed rarely, or not at all, were amazed to find they had strong memories of dreams when they were awakened during a REM period. New facts came to light: Nightmares and sleepwalking occur only during NREM sleep. The belief that a long dream could last only a few seconds proved to be a myth. Types of food eaten during the day have no effect on REM dreams. Recordings played during sleep have no influence on learning, although such spurious claims continue to be made today for audiotapes widely advertised, even in a few popular science magazines.

Intensive research on REM sleep was taken up in scores of laboratories around the world. It was discovered that almost all mammals so far tested have REM sleep periods (including bats, moles, and whales) except, curiously, Australia's spiny anteater. Reptiles lack REM sleep, but birds seem to have intervals of REM that last a few seconds while their heads are under their wings. Dogs and cats clearly have REM dreams. You can lift a dreaming cat's eyelids and see the eyeballs dart back and forth.

REM dreaming surely serves some useful function, otherwise why would evolution have invented it? Exactly what that function is remains a riddle. One plausible argument is that during the night, when it is difficult to hunt for food, mammals began to rest their bodies and minds until the sun arose. Some mammals even hibernate through cold winters. This, however, sheds little light on the function of dreams.

The computer revolution, and the view of AI (Artificial Intelligence) researchers that a brain is nothing more than an organic computer, led inevitably to computer-derived theories of dreaming. One of the earliest papers advocating such a theory was "Dreaming: An Analogy from Computers," in *New Scientist* (vol. 24, 1964, pp. 577-579). The authors were two British scientists: psychologist and science fiction writer Christopher Riche Evans, and computer expert Edgar Arthur Newman. In 1993 Evans's posthumous work *Landscapes of the Night: How and Why We Dream* was published. His 1973 book *Cults of Unreason* contains a major attack on Scientology.

The Evans-Newman theory is that the brain, like a computer, gets cluttered with useless information. Just as a computer's memory has to be routinely cleaned of unwanted junk, so too does our brain need periodic scrubbing. Dreams are the process by which the sleeping brain moves information worth preserving into its long-term memory, and erases from short-term memory the trivia that otherwise would clog neural pathways. Why remember such things as the color of the socks you wore yesterday, or what you had for lunch, or everything you said during idle conversation?

As electrical impulses zip around the brain to eliminate such garbage, the pulses activate adjacent neurons to call up patterns that are essentially random. Our unconscious brain does its best to put these images into some sort of coherent scenario, but because they are randomly accessed, the dream story exhibits bizarre nonsense and abrupt transitions like the scenes in Lewis Carroll's two *Alice* books. For an hour or two every night we go harmlessly insane!

Freud believed that dreams are symbols expressing in heavily disguised form the repressed wishes of the id (unconscious), most of them sexual and going back to childhood. If not disguised, Freud believed, our shocked superego, with its moral imperatives, would wake us up.

Carl Jung discarded what he thought was Freud's overemphasis on repressed sexual desires. In his view dreams reflect "archetypes"—memory traces inherited from our evolutionary past. Dreams of flying and falling, for example, are genetic memories of ancestors swinging through trees and occasionally dropping to the ground. Terror dreams of being pursued reflect times when our ancestors fled from fierce beasts. For Jung, dreams do not so much conceal as they reveal these ancient memories buried in what he called humanity's "collective unconscious."

Evans and Newman have no use for either Freud or Jung. Dreams, they argue, are essentially nonsense, though of course influenced by hopes and fears, and by night events such as sounds, smells, temperature, drafts, bodily distresses, and so on. Our brain filters out accustomed noises, such as rain, the hum of an air conditioner, or a television set left on, but sudden, unusual sounds, such as a baby's cries, a thunderclap, or a ringing phone, either wake us or are incorporated into a dream. If we are thirsty we may dream of drinking; if hungry we may dream of eating. If our bladder is full, we may dream of urinating. If our face is sprayed with water, we may dream of taking a shower.

Just as it is difficult to remove unwanted data from a computer while it is working on a problem, we would go mad if the sweeping of junk from our memory occurred while we are awake and busy processing new sensory inputs. It is not so much that dreams open up storage space, Evans and Newman maintain, as that they clear pathways to provide simpler, more direct access to significant memories. If unwanted data is not routinely removed from a computer, its speed and efficiency are reduced, and the software may even crash. Similarly, if we are deprived of REM dreaming, we develop behavior disorders and mental distress until allowed to dream again. Instead of dreams preserving sleep, as Freud believed, it is the other way around. We sleep in order to dream.

In the early 1980s Francis Crick, a Nobel Prize winner for his role in discovering the helical structure of DNA, and mathematician Graeme Mitchison proposed a dream theory similar in some respects to the Evans-Newman conjecture. Their speculations were first presented in "The Function of Deep Sleep," in *Nature* (vol. 304, July 14, 1983, pp. 111-114). Instead of the brain becoming clogged with junk memories, its neocortex becomes clogged with accidental neural connections.* The brain's billions of neurons are interconnected in an inconceivably complex web—the most complicated structure known in the universe. When normal memories are stored, the process tends to strengthen unwanted neural connections. Crick and Mitchison call them "parasitic memories." The purpose of REM sleep is to dampen these accidental synaptic connections and so erase spurious memories. Such a random process naturally fabricates bizzare nonsense scenes.

Babies experience twice as much REM sleep as adults, and even show REM in the womb—facts that, if they are actually dreaming, seem to contradict Freud's theory. For Crick and Mitchison, babies dream to keep their brain as free as possible of undesirable neuron connections that otherwise would interfere with the efficient formation of memories. The spiny anteater's lack of REM is explained by its unusually large neocortex. Just as neural nets of computers, if huge, can accommodate spurious neural connections without overloading, so can the anteater's oversize neocortex.

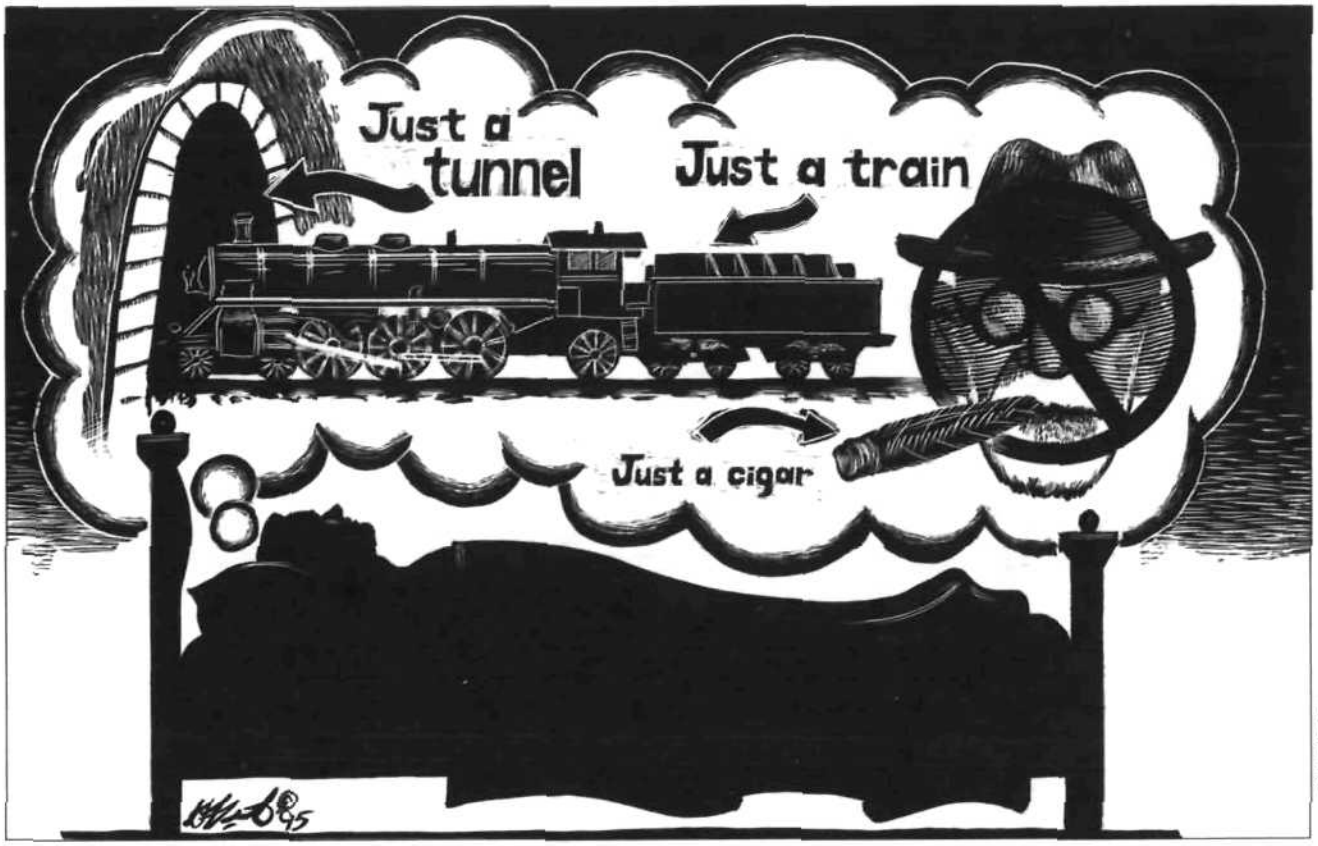
Freudians find it useful to recall and analyze dreams. Crick and Mitchison suggest otherwise. "We dream," they write in *Nature*, "in order to forget." Efforts to recall dreams may actually do harm. "Attempting to remember one's dreams should perhaps not be encouraged because such remembering may help to retain patterns of thought which are better forgotten. These are the very patterns the organism is attempting to damp down." (See Theodore Melnechuk's article on Crick's theory, "The Dream Machine," in *Psychology Today*, November 1983.)

Many other conjectures about dreaming have been proposed in recent years, but far and away the best and most influential of recent books on the topic is *The Dreaming Brain* (1989) by J. Allan Hobson, a psychiatry professor at Harvard Medical School. His commonsense views, like those of most of today's dream researchers, are strongly anti-Freud.

Hobson agrees with the two theories just discussed that dreams have no hidden or "latent content," to use Freud's terminology. They have only a "manifest content." They are what Hobson likes to call, echoing Jung, "transparent." Instead of erasing trivial memories, or damping down unwanted accidental neural connections, the brain is merely using its electrical energy to fire neurons more or less randomly while we sleep. In doing so, its images are naturally influenced by recent events (what psychoanalysts call "day residue"), by old memories, by conditions in the bedroom, by body states, and by strong hopes and fears.

Because dreams do not disguise unconscious wishes, no insights into dreams can be gained by free association tests or by trying to interpret outlandish Freudian symbols. Dreams are just what they seem to be. If you dream of missing a train or a plane it is because in life you have experienced such unhappy events. If you dream of a friendly encounter

*The neocortex is a highly developed part of the cortex—the outside layer of gray matter—that began its evolution with mammals. It is thought to be the region where memories are finally stored, and where reasoning takes place.




Gerald Fried

with a relative or other person it is because you are fond of that person. If you dream of an unfriendly encounter it is because you dislike or fear that person. If you dream of flying it is because you often imagine how pleasant it would be to flit about through the air, perhaps reinforced by memories of diving into water, jumping, skating, sledding, and so on.

Freud is said to have remarked that in dreams a cigar may be nothing more than a cigar. For Hobson, a dream cigar is always a cigar. I once had a lucid dream in which I found myself in a strange room with a smoking cigar on an ashtray. Aware that I was dreaming, I decided to experiment to see if in addition to vivid imagery (I could see intricate patterns on wallpaper), my dream could include smells. I picked up the cigar and held it to my nose. The result was such a strong odor of burning tobacco that it woke me up. My dream cigar was only a cigar.

Hobson recalls a vivid dream in which, during a visit to Boston's Museum of Fine Arts, he saw and heard Mozart play a piano concerto. He noticed that Mozart had gotten fat. A Freudian analyst might conclude that Mozart was a father image and that his being overweight symbolized Hobson's unconscious wish to kill his father so he could have his mother to himself. Hobson notes that the concerto was one he knew well. He often listens to Mozart while driving, and he frequently visits the Boston Museum of Fine Arts. His own belly was starting to bulge. The dream had no latent meaning. As Hobson puts it, "Mozart is Mozart." More recent books by Hobson are *Sleep* (1989) and *The Chemistry of Conscious States* (1994).

Although we spend a third of our life knocked out, why this is necessary to our health is still unclear. We know sleep refreshes the body, and that somehow it knits up the raveled sleeve of care, as Shakespeare's Macbeth says. The notion once held that dreams "rest" the neurons has to be discarded because neurons are now known to be as active during sleep as when we are awake. Hobson conjectures that the rest theory can be revived if we assume that dreams relax fatigued neurotransmitters in the brain that actually do damp down their firing markedly during REM sleep. Another Hobson conjecture is that maybe evolution developed dreaming partly as a form of entertainment, since most dreams are amusing and delightful, like reading a fantasy tale or watching such fantasy plays and movies as *Midsummer Night's Dream.*

In all three theories the bizarre nature of dreams is explained by haphazard neuron firing, and by the brain's efforts to connect nonsense scenes into a plausible scenario. (This is not the place to discuss lucid or out-of-body dreams in which one is aware that one is sleeping and has a modicum of free will in controlling episodes. See Susan Blackmore, *Beyond the Body: Investigations of Out-of-the Body Experiences,* London: Heinemann, 1982.)

Now that Freud's dream theory is rapidly evaporating like a bad dream, where is dream theory today? Although much is still being discovered, and many rival theories are being proposed, exactly how and why we dream remains a deep mystery. Surprisingly, today's speculations are not much different from what they were for Plato and Aristotle. □

# Fund for the Future

CSICOP AT THE CENTER FOR INQUIRY

With the completion of its headquarters campus, The Committee for the Scientific Investigation of Claims of the Paranormal is poised for an explosion of growth. We appeal for your help in assuring adequate funding—now and in the future—for the bold initiatives that will shape the outreach of science and reason in the years to come.

To carry out its objectives in the second half of this decade, CSICOP has formulated specific program and project goals.

**1) Critical Thinking / Science Education**
The Committee proposes to develop new materials—ranging from publications to audio and video cassettes and instructional courseware—to disseminate broader and more accurate knowledge about scientific methods and to teach improved critical thinking skills.

**2) Media Watch / Rapid Response**
The Committee proposes to equip itself to be able to monitor major media on a continuing basis, and to be able to respond to claims quickly. This will entail additional staffing for continuous media monitoring, establishment of an e-mail network to permit rapid formulation of responses by qualified experts, and development of e-mail, FAX broadcast, and other capabilities to assure instantaneous dissemination of our statements to local, national, and world media.

In addition, the Committee plans to step up its production of audio and video materials through Inquiry Media Productions. Targets include sequels to the successful public education video Beyond Belief, talking books, a radio op-ed series, and a new public affairs series for public radio. Full implementation will require additional staffing and significant investments in production and distribution equipment.

**3) The Institute for Inquiry**
The Committee proposes to complete the development of its Institute for Inquiry adult education program. The Institute for Inquiry is already the nation's foremost provider of education on the subjects of skepticism, the scientific method, and the critical evaluation of paranormal and fringe science claims. Hundreds of persons have attended Institute for Inquiry courses at scores of locations.

**4) The Library of Skepticism**
With the establishment of the John and Mary Frantz Skeptics' Library in memory of Margaret Frantz at the Center for Inquiry, CSICOP has created a permanent repository to house and maintain the world's literature about the scientific analysis of paranormal claims—and to make it accessible to scholars and other qualified users.

CSICOP at the Center for Inquiry,
Box 703, Amherst, N.Y. 14226
(716) 636-1425

# Science in The Age of (Mis)Information

June 20–23, 1996 • State University of New York at Buffalo • Buffalo, NY

*World Skeptics Congress—20th Anniversary of CSICOP*

***SPONSORED BY THE COMMITTEE FOR THE SCIENTIFIC INVESTIGATION OF CLAIMS OF THE PARANORMAL***

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## THURSDAY, June 20, 1996

**2 p.m.–6 p.m. "The Role of the Mass Media in (Mis)Informing the Public"—Slee Hall, Amherst Campus**

*Welcome:* **Paul Kurtz,** Prof. Emeritus of Philosophy, SUNY at Buffalo; Chairman CSICOP
*Moderator:* **Milton Rosenberg,** Prof. of Psychology, University of Chicago
**George Gerbner,** Prof. of Communications, University of Pennsylvania
**Leon Jaroff,** Senior Editor, *Time* Magazine
**Piero Angela,** Journalist, Italy
**Phillip Adams,** Australia
**John Paulos,** Prof. of Mathematics, Temple University
**Dean Edell,** National Radio Medical Commentator (tentative)

**6 p.m.–8 p.m.** Dinner (on your own)

***8 p.m.–10 p.m. Conference Address***

**Leon Lederman,** Emeritus Director of Fermilab, and Nobel Laureate in Physics
**Slee Hall, Amherst Campus**

## FRIDAY, June 21, 1996

**9 a.m.–11:45 a.m. "The Growth of Anti-Science"**

*Moderator:* **John Maddox,** Former Editor, *Nature* (tentative)
**Paul R. Gross,** Director of the Center for Advanced Studies, University of Virginia
**Norman Levitt,** Prof. of Mathematics, Rutgers University
**Susan Haack,** Prof. of Philosophy, Univ. of Miami

**12 noon–1:50 p.m.** Luncheon—Speaker: Chris Carter, Creator of "The X-Files" Television Program

**12 noon–1:30 p.m.** Press Conference—Green Room, Center for the Arts, Amherst Campus

**2 p.m.–3:30 p.m.** Concurrent Sessions—Knox Lecture Hall, Amherst Campus

**UFOlogy**

**Philip J. Klass,** Aerospace Writer, Member CSICOP Executive Council, Washington, D.C.
**James McGaha,** Major, USAF, Tucson, Arizona

**Astrology**

*Moderator:* **Cornelius de Jager,** Astrophysicist, Univ. of Utrecht, Netherlands
**J. W. Nienhuys,** Prof. of Mathematics, Technical University, Eindhoven, Netherlands
**Ivan Kelly,** Prof. of Psychology, Univ. of Saskatchewan

**Homeopathy**

**Prof. Wim Betz M.D.,** Academish Centrum voor Huisartsgeneeskunde VUB, Belgium
**James Randi,** Conjurer, Author, Plantation, Florida

**3:30 p.m.—5 p.m.** Concurrent Sessions—Knox Lecture Hall, Amherst Campus

**Theraputic Touch**

**Béla Scheiber,** System Analyst, Boulder, Colorado
**Vern Bullough,** Prof. of History, California State Univ. at Northridge
**Bonnie Bullough,** Prof. of Nursing, Univ. of Southern California

**Chiropractic**

**Stephen Barrett,** Psychiatrist, Allentown, Pa.
**William Jarvis,** Prof. of Health Promotion and Education, Loma Linda University

**Creation/Evolution**
Eugenie C. Scott, Anthropologist, Exec. Dir., NCSE
H. James Birx, Prof. of Anthropology, Canisius College

**5 p.m.–7 p.m.** Dinner (on your own)
**7 p.m.–8 p.m.** Reception (cash bar), Atrium, Center for the Arts, Amherst Campus
**8 p.m.–10 p.m. Keynote Address: Stephen Jay Gould,** Museum of Comparative Zoology, Harvard University—Main Stage, Center for the Arts, Amherst Campus

## SATURDAY, June 22, 1996

**9 a.m.–12 noon "Parapsychology: Recent Developments"**—Slee Hall, Amherst Campus
*Moderator:* James Alcock, Professor of Psychology, York University, Toronto, Canada
Ray Hyman, Professor of Psychology, University of Oregon
Richard Wiseman, Professor of Psychology, Univ. of Hertfordshire, U.K.
Susan Blackmore, psychologist, Univ. of the West of England, Bristol, U.K.
Jessica Utts, Professor of Statistics, Univ. of California at Davis

**12 noon–1:45 p.m.** Lunch at Center for Inquiry (speaker to be announced)
**2 p.m.–3:30 p.m.** Concurrent Sessions—Knox Lecture Hall, Amherst Campus

**Mechanisms of Self-Deception: How We Misinform Ourselves**
Barry Beyerstein, Biopsychologist, Simon Fraser University, Canada
Thomas Gilovich, Psychologist, Cornell University (tentative)

**Alternative Health Cures**
Jack Raso, Board Member, National Council Against Health Fraud; Editor, *Nutrition Forum*
Wallace Sampson, Clinical Prof. of Medicine, Stanford Univ.

**Philosophy and Pseudoscience**

**3:30 p.m.–5 p.m.** Concurrent Sessions—Knox Lecture Hall, Amherst Campus

**Psychoanalytic Theory and Therapy After 100 Years**
Adolf Grunbaum, Prof. of Philosophy, University of Pittsburgh

**Critical Thinking in Education**
*Moderator:* John Kearnes, Professor of Philosophy, SUNY at Buffalo
Clyde Herreid, Dept. of Biology, SUNY at Buffalo
Lee Nisbet, Prof. of Philosophy, Medaille College, Buffalo
Carol Tavris, Psychologist, Author, Los Angeles

**Spiritualism and the University at Buffalo Exposé**
Joe Nickell, Senior Research Fellow, CSICOP
Gordon Stein, Director, Center for Inquiry Library

**7 p.m.–10 p.m. Awards Banquet,** Hyatt Regency, downtown Buffalo

## SUNDAY, June 23, 1996

**9 a.m.–12 noon World Skeptics Update**
*Moderator:* Barry Karr, Executive Director, CSICOP
Tim Trachet, Comittee Para, Belgium
Mario Méndez-Acosta, Mexican Association for Skeptical Research, Mexico
Amardeo Sarma, Society for the Scientific Investigation of Para-Science, Germany
Michael Hutchinson, SKEPTICAL INQUIRER representative, United Kingdom
Miguel Sabadel, Alternativa Racional, Spain
Henry Gordon, Ontario Skeptics, Canada
Stephen Basser, Australian Skeptics, Australia

**Registration information will be available in the March/April issue of the SKEPTICAL INQUIRER**

**MEDIA WATCH**

C. EUGENE EMERY, JR.

# Who Plays the Fool When *Discover* Magazine Hoaxes Its Readers?

It appears you can't believe everything you read in *Discover* magazine.

Last April, people who turned to the "Breakthroughs" section of the popular monthly science magazine learned about the discovery of tiny molelike creatures that lurk in the Antarctic ice and prey on penguins. The story explained how these creatures, called "ice borers," trap penguins by generating enough heat to turn the ice beneath the penguins' feet to slush, then attack.

The story, sandwiched between news about Antarctic ice algae and sea level changes, came complete with a photograph of one of the ice borers.

It was fascinating, and it was a hoax.

*Discover* magazine wasn't duped. The magazine's staff, apparently bored by the real science stories it's supposed to cover, decided to trick its readers, then not let many of them in on the joke.

There were some clues. It was the April issue of the magazine. The wildlife biologist's name was Aprille Pazzo (which is Italian for April Fool or April Crazy). Pazzo is quoted as saying that the ice borers can melt their way through ice at speeds "much faster than a penguin can waddle."

To folks who picked up on the joke on their own, it was great fun. It was also a valid reminder to all of us that we all need to be skeptical about what we read, even in a publication such as *Discover* that has a reputation for accuracy.

Good jokes, however, eventually let everyone in on the fun—especially the victim. Cruel jokes don't.

In *Discover*'s case, there was no April Fool's Day pronouncement at the end of the item, no April 1 dateline, no editor's note suggesting that the ice borer story should only be read on April 1, and no prominent alert to readers that one of the stories in the issue was fabricated.

Instead, readers who didn't recognize the bogus story—because they weren't on the lookout for an April 1 hoax in an issue that appears in mid-March, or because they don't speak Italian, or because they didn't realize that the thermodynamics were questionable, or because they didn't recognize a doctored picture of a naked mole rat, or because they've simply come to trust *Discover*—were played the fool.

And the *Discover* staff let these folks continue to play the fool long after April 1 had come and gone.

This isn't the first year *Discover* has done this. The April 1994 "Breakthroughs" section included an odd account of archaeologist Leon Decoeur unearthing a cup in Jerusalem that he believed to be the Holy Grail. It said that a drop of blood found at the bottom of the cup turned out to be type O positive, the universal donor type. "Just what you'd expect of Jesus, says Decoeur," read the magazine item, which went on to wonder about the likelihood of using the blood to eventually clone Jesus.

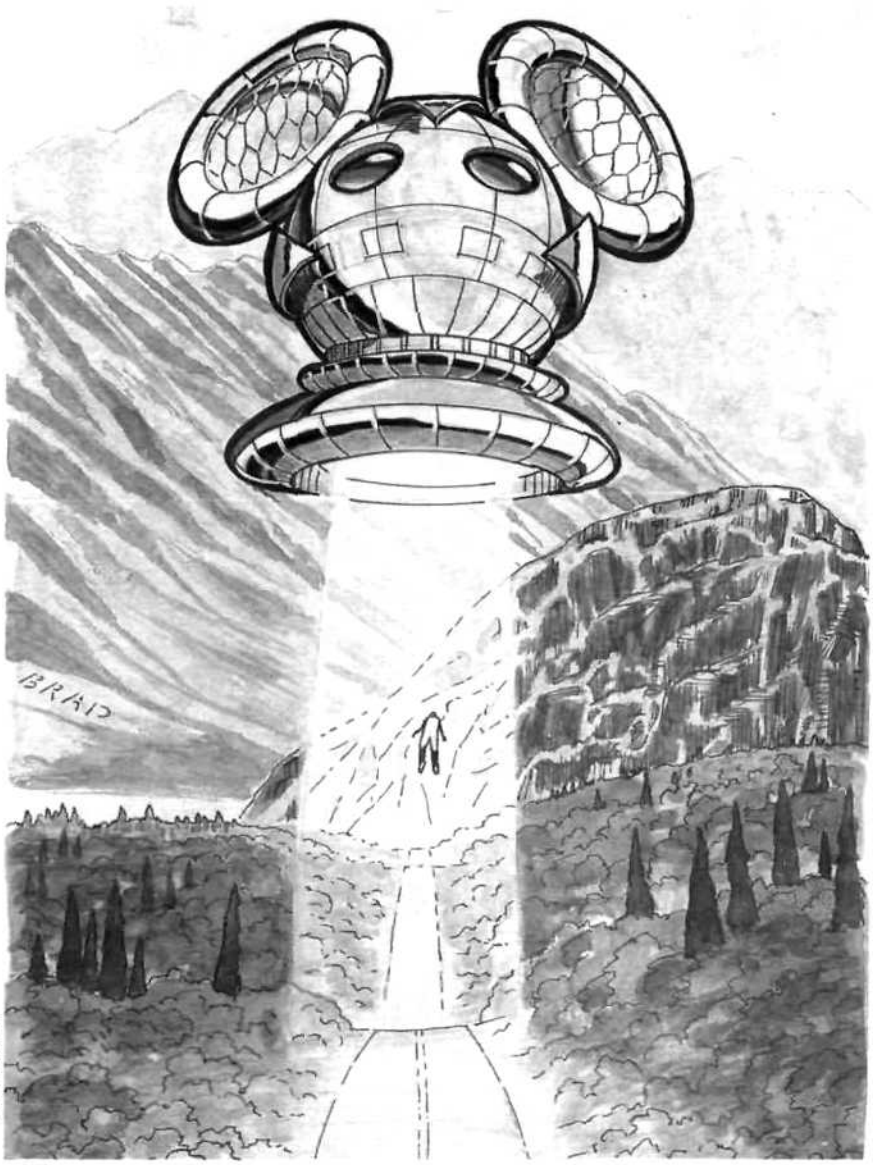
(At least one computerized cataloguing service, InfoTrac Magazine Index Plus from Information Access Co., logged the fictitious grail story in the nonfiction database it sells to libraries.)

*Discover* Managing Editor Roseann Henry told William Allen of the *St. Louis Post-Dispatch* that the Holy Grail story produced little reaction and only about one in ten callers and letter writers objected to the ice borer story. But that's a skewed statistic because it doesn't factor in the people who failed to recognize the joke.

"This was a hoax in the tradition of April Fool's jokes in science magazines," Henry told Allen. *Discover* Editor in Chief Paul Hoffman echoed the same theme when I spoke with him.

In the June 1995 "Letters to the Editor" section of *Discover,* several readers who recognized the ice borer hoax responded in the same vein as the original article.

"What an extraordinary creature! This would be a fantastic addition to our collection," wrote Shigatsu Baka, of the Small Mammal Zoo and Discovery Center in San Francisco. One woman reported that she found evidence of the animals in the diary of explorer Philippe Poisson. Loof von Lirpa, of the Smithsonian in Washington, claimed that *Discover* erred in reporting a body temperature of 110 degrees (it was supposed to be 107.56 in the front and 70.2 degrees in the rear).




Brad Marshall

Others offered their own tongue-in-cheek accounts, such as the physician who reported seeing a figure skater mysteriously disappear in Central Park's ice rink, and the New York man who recalled the 1950 investigation of several peewee hockey players in Quebec, where a colony of "hotheads" was found living between the rink's blue lines.

But reader Jenny Garner of Oregon cut to the heart of the issue, asking: "How many more of the articles were April Fools' jokes? Rats on Prozac, mini-mammoths, and buddy-system birds all now appear to stretch reality beyond belief."

That's the point.

The wonder of real science lies in its ability to reveal sometimes-astonishing truths. It's difficult to experience that sense of wonder when the work of legitimate scientists is forced to compete with pseudoscientists claiming unfounded breakthroughs and quacks hawking bogus cures.

There are too many people in the media willing to popularize and perpetuate nonsense for the sake of circulation and ratings points. That's why the publication and programs that care deeply about their credibility should be cherished.

And that's why, in our world of everyday pranksters and growing scientific illiteracy, *Discover*'s idea of an April Fool's Day joke rings hollow.

*Discover*'s decision to deceive science-hungry folks who look to the magazine as a reliable source of knowledge suggests either a surprising level of contempt for the very audience it should be coveting, or a chronic case of poor judgment in gauging how quickly readers can spot a joke that, to the magazine's staff, seems obvious.

The best-known example of an April Fools' Day hoax in a monthly magazine was in an April issue of *Scientific American* two decades ago, where then-columnist Martin Gardner detailed "Six sensational discoveries that somehow or another have escaped public attention." They included a bogus page from Leonardo da Vinci's notebook showing a flush toilet, a map that requires five colors to color (violating the four-color conjecture), and a simple motor that runs on psychic energy. Gardner said the motor was made by Robert Ripoff and he also cited the work of Henrietta Birdbrain.

Gardner got a taste of the tangled web he had woven after his 1975 *Scientific American* column sparked letters from scientists who pointed out the logical error in one of the six items dealing with their field of expertise. "But they accepted all the others. A lot of readers got taken in by one or more of the items," Gardner said. "I had such fake names in it that I really didn't expect anybody to take it seriously. But they did."

The June 1995 "Letters to the Editor" column in *Discover* may suggest a final reason why a science magazine doesn't want to hoax its readers: It's an open invitation to be deceived in return.

Remember the tongue-in-cheek letters from readers? Take the "von" out of writer Loof von Lirpa and you get "April Fool" spelled backward. The Small Mammal Zoo and Discovery Center where Baka supposedly works couldn't be found through directory assistance in San Francisco nor in a check of various directories of zoos in the United States.

Was *Discover* hoisted on its own petard, or did it have no qualms about publishing letters from bogus readers as well?

Hoffman said the letters were not made up by the *Discover* staff. He said *Discover* was not duped by any of the letters. The jokes and phony names should have been obvious to readers. "We're not going to mislead anybody," he said.

*Discover* plans another April Fools' Day story in 1996, Hoffman said.

* * *

Now that *Discover* has gotten comfortable hoaxing its readers, maybe it will start giving us breathless accounts of discoveries about ESP and alien kidnappings.

The magazine, which is owned by the Walt Disney Company, probably is under corporate pressure to give us a story about UFOs. Disney has been promoting the idea that UFOs are extraterrestrial spacecraft as part of a campaign to drum up business for its new Disney World attraction "ExtraTERRORestrial Alien Encounter."

The attraction, part an overhaul of the "Tomorrowland" section of the Magic Kingdom, features a malevolent alien teleporting into an auditorium full of tourists. The lights go out, the creature breaks out of the teleportation tube, and people can feel the bat-winged creature—with glowing red eyes and fangs that drip goo—move about.

To gear up for the premiere, Disney scheduled a "UFO Summit" to let news media representatives meet with UFO promoters.

It also distributed a syndicated documentary, "Alien Encounters From Tomorrowland," that looked like it had been produced by somebody who spent too much time in Fantasyland. In addition to the usual tales of abductions by space aliens, the documentary dredged up virtually every questionable UFO tale currently in vogue, presenting it as real.

There was Jimmy Carter's UFO sighting (with no mention of Venus), the Gulf Breeze UFO appearances (with no mention of the UFO model that was discovered), and outrageous assertions, such as the suggestion that the U.S.-Soviet hot line was put in place to prevent having a nuclear war triggered by a visit from an extraterrestrial spacecraft.

Topping it off was the assertion by host and actor Robert Urich that the Disney World attraction was "designed [as] a way to prepare humans for their inevitable alien encounter." I'm sure the extraterrestrials have been hovering overhead all these years just waiting for someone at Disney to come up with a scary ride that will make the shock of "first contact" less traumatic to earthlings.

Dorothy Rabinowitz, in the March 6, 1995, *Wall Street Journal,* put it best: "Perhaps Mr. Eisner and Disney can next offer us a new Tomorrowland feature—this one on all the people who know that the CIA is controlling them through radio waves emanating from fillings in their teeth."

* * *

Harvard University psychiatrist John Mack says he's looking for a rational, dispassionate, scientific examination of reports about UFO abductions, but the people promoting Mack's work weren't showing much restraint when they were generating media attention for the paperback release of his book *Abduction: Human Encounters with Aliens.*

"Thousands Abducted By Space Aliens!!! You May Be Next!!!" was the headline on the press release from the New York-based Planned Television Arts (PTA), which arranged for an hour-long conference call between Mack, an alleged abductee, and several journalists on behalf of Mack and his publisher, Ballantine Books.

The news release explained how the hardcover version of Mack's book "was immediately attacked by 'rationalists' who refuse to accept any ideas outside of their accepted reality."

It urged reporters to be open-minded, claimed that "millions" may have been abducted, and told journalists to "Remember, in 1492 most thought the world to be flat, and Columbus to be crazy." (It's always interesting to hear people suggest that if you're being deemed crazy, you're probably a visionary. It's particularly ironic to hear the argument used to promote UFOs. After all, weren't the people who laughed at Columbus the same people who, like Mack, believed in strange monsters?)

PTA didn't enhance the credibility of Mack's book or his publisher when it released a transcript of the interview and made references to "antidotel" evidence, psychologist "Carl Young" and flying saucer expert "Jay Ellen Hineck." Perhaps they meant anecdotal, Carl Jung, and J. Allen Hynek.

* * *

A sales pitch by the New York Times Syndicate to newspapers around the country offers a revealing look at the symbiosis that sometimes exists between astrologers and the print media.

This story involves English astrologer Patric Walker (who died in October 1995).

The syndicate was offering in 1995 to provide its Patric Walker Horoscope free to any newspaper that generated enough calls on Walker's 900-number lines, which offered weekly recorded forecasts (at 99 cents a minute), and to the AstraScope Astrologer Line, a network of astrologers giving live readings for $2.99 a minute.

"You earn 15 cents a minute per call from the taped Walker service, and 45 cents a minute per call from the AstraScope Astrologer line. (Other services usually credit you only 40 cents per call, not per minute)," the sales pitch said.

And what were Walker's qualifications?

The syndicate quoted *Mirabella* magazine editor Gay Bryant: "*Nobody* is as good"; William Grimes in the *New York Times Magazine:* "The class of the field among popular astrologers working today"; and *People* magazine: "Uncanny ability to zero in on *your* day."

To see if Walker had the uncanny ability to zero in on the day that 168 people were killed in the Oklahoma City bombing, I checked his advice for April 19, 1995. The only excerpts that might be considered even close to being relevant:

Taurus: "Problems within your personal and working life are causing headaches."

Cancer: "You're inclined to analyze or pick over the bones [Walker is talking about relationships]. But don't moan, wail and carry on."

Leo: "The ax must fall."

Virgo: "Forthcoming incidents may cause sleepless nights."

Libra: "A certain amount of intrigue in the air." □

JOE NICKELL

# 'The Devil's Footprints': Solving a Classic Mystery

The case of "The Devil's Footprints" is a classic of the "unsolved" genre, having been featured in Rupert T. Gould's *Oddities: A Book of Unexplained Facts* (1928, 1964); Frank Edwards's *Stranger than Science* (1959); C. B. Colby's *Strangely Enough* (1971); Rupert Furneaux's *The World's Most Intriguing True Mysteries* (1977); Martin Ebon's *The World's Greatest Unsolved Mysteries* (1981); and many other anthologies and compendia of the unexplained. The fullest account, complete with the original source material, is given by Mike Dash in *Fortean Studies* (1994).

Colby tells the story in concise form:

> There was no denying the footprints in the snow on the morning of February 9, 1855. The odd tracks appeared in several towns in South Devon, England. Residents of Lympstone, Exmouth, Topsham, Dawlish, and Teignmouth all reported the same thing. During the night some weird and uncanny creature had raced in a straight line through these towns, covering a hundred miles and more and leaving behind the tracks nobody could identify.
>
> Each track, about 4 inches in length and 2-3/4 in width, was exactly 8 inches apart. They were roughly shaped like a hoofprint and were promptly christened "The Devil's Footprints" by all who saw them. Even the conservative *London Times* printed a report of the footprints in the snow. . . .
>
> Going straight across country, the tracks never swerved. They were found upon the top of 14-foot walls and they crossed the roofs of barns and houses, went up and over snow-covered piles of hay and even appeared on the tops of wagons which had been left out all night.
>
> It was as if the creature had leaped up or down, for the tracks showed no apparent change of pace or speed. In many places it was reported that the snow had been "branded" away or melted from the ground where the "feet" had touched. . . .
>
> Over the hundred-mile course, the distance between the tracks never varied from the regular 8 inches, yet how could anyone or anything travel that far in a single night without varying its stride?
>
> Too many people saw the tracks for it to have been a joke or a local phenomenon. In some instances the prints vanished at the edge of unfrozen ponds or rivers, and appeared again exactly in line on the opposite side, to race away in that straight and mysterious flight across the sleeping countryside. And in all that distance, no one saw it, no one heard it. Only the tracks remained as evidence of the creature's passing.

Some sources, like Edwards (1959), incorrectly give the date as February 7, 1855, the confusion resulting from early reports mentioning the night of the eighth. By the seventeenth the story had reached the national newspapers, which published correspondents' accounts through mid-March. Experts from the Zoological Gardens in Regent's Park and from the British Museum were silent, but others offered theories that postulated everything from an escaped kangaroo to birds, rats, cats, foxes, and other creatures. No kangaroo was on the loose, but the naturalist Sir Richard Owen (1855) claimed the solution to the mystery was a badger, based on his interpretation of published drawings and descriptions of some of the tracks. But Owen's solution, like those of others, failed to account for all of the reported factors. As one writer noted, a badger could not have "jumped a fourteen-foot wall or squeezed through a six-inch drain pipe, let alone have left clear marks on the sill of a second-storey window!" (Brown 1982).

So what is the solution? It begins with the acknowledgment that "no one explanation will cover all the reported factors" (Brown 1982). But that statement is meant to imply some further, unknown source—perhaps, as many of the mid-nineteenth-century rural South Devon folk thought, the Devil himself.

Suppose, however, we postulate that the various reports are manifestations of what psychologists call *contagion*—a term I like to define by an example: In 1978, in Holland, a media alert regarding a small panda that had escaped from a zoo in Rotterdam resulted in some 100 panda sightings made all over the country, yet, as it turned out, the panda had been killed by a train a few yards from the zoo and obviously no one had

seen the rare animal (Van Kampen 1979). How do we explain the many sightings? The answer is contagion: an idea or concept that is spread by suggestion, somewhat analogous to a contagious disease. In other words, people's anticipations can lead them to misinterpret what they have actually seen. One person perceives out of the corner of his or her eye a dark shape crossing a yard; thus a dog becomes a "panda." Someone driving in the countryside sees a rustling in some bushes, and so what is actually a native wild animal triggers another panda sighting. Soon, hoaxers will get in on the act and phone in bogus reports. Not surprisingly, contagion is easily recognizable in many paranormal events such as certain UFO and monster "flaps" (Nickell 1995).

Just as there were many sightings attributed to a single panda on the loose in the case in Holland, many factors must surely have been involved during that brief period of near hysteria in February of 1855 in South Devon. In fact, although Furneaux (1977) continued to treat the case as a mystery, he briefly suggested the basic explanation of the case:

> On 8 February there had been a slight thaw; more snow fell that night and a freezing wind got up at dawn, enlarging and distorting, perhaps, the prints of hundreds of badgers, otters, rats and cats.
>
> The prints were discovered over a wide area and they were observed by hundreds of people. No one observer tracked them all. Everyone needed to rely on the reports of others. The stories told agreed as to size and shape, because everyone tried to fit his or her observations into the general pattern.

On this last point, however, Furneaux is partially in error. Many of the early descriptions were clearly contradictory, thus helping establish that there were indeed multiple creatures involved. Some drawings showed hoofmarks that were "plainly made by a pony-shoe" (Brown 1982), while others described tracks that were "cloven." Some reported "claws" and "toes" in the tracks (Brown 1982; Furneaux 1977).

By no means did all correspondents report tracks of exactly the same size and spacing. For example, the account published in *The Times* (London) of February 16, 1855, stated that the tracks varied from 1-1/2 to 2-1/2 inches in width, and while their spacing was "generally" eight inches (Gould 1928, 1964), other sources represented the stride as up to twice that distance (Dash 1994). Nor were the tracks in a straight, unbroken line, as shown by various sources, including a dossier kept in a parish church by the Reverend H. T. Ellacombe, who had been vicar in 1855. Says Brown (1982):

> He made careful drawings of the tracks and had found that the marks were *not* continuous, but appeared sporadically, e.g. suddenly in the middle of a field, with a flurry surrounding them, as though made by a large ice-laden bird struggling to take off. It was noticed in the estuary that many of the birds seeking water were liable to become frozen into the water, as has happened in some more recent frosts this century. So birds with ice on their feet seem part of the solution, but not all.

**Figure 1.** Map showing the Devonshire, England, localities in which the "Devil's Footprints" were observed in early February 1855. (From *Oddities: A Book of Unexplained Facts*, by Rupert T. Gould, Bell, 1964.) Contrary to some reports, the trail did not extend in a straight line but zigzagged as shown.

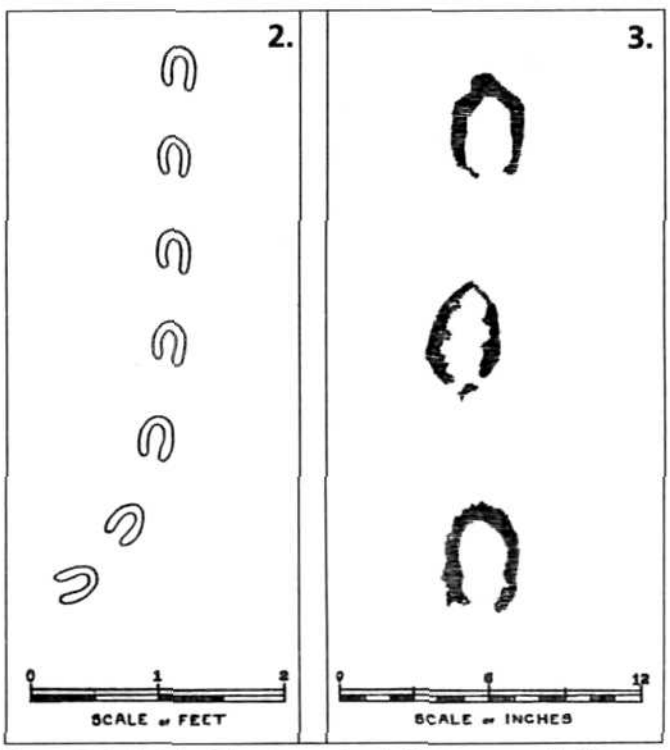



**Figure 2.** A sketch of the strange tracks that appeared in the *Illustrated London News*, February 24, 1855. (From *Oddities: A Book of Unexplained Facts*, by Rupert T. Gould, Bell, 1964.)
**Figure 3.** Another sketch, portraying "hoofmarks," published in the *Illustrated London News*, March 3, 1855. (From *Oddities: A Book of Unexplained Facts*, by Rupert T. Gould, Bell, 1964.)

**Figure 4.** The Rev. H. T. Ellacombe (1790-1885) who examined the "Devil's Footprints" and assembled a skeptical dossier on the case. (From *Devon Ghosts,* Theo. Brown, Jarrold,1982.)

Moreover, Gould (1928, 1964) dismissed as "in the last degree unlikely" that any one person had followed the tracks continuously for the alleged 100 or more miles.

As for Colby's (1971) claim that "the tracks never swerved," that is simply not true. First of all, there is *The Times* report: "The creature seems to have approached the doors of several houses and then to have retreated." Indeed, Dash (1994) correctly notes: "Contemporaries reported meandering lines of prints crisscrossing gardens and churchyards," and a map of the area shows the large-scale zigzagging that is necessary to connect all the villages where the tracks were reported (Gould 1928, 1964).

The notion of the unswerving line seems to have originated from accounts that mention the tracks appeared in a straight line, with one print directly in front of the next. And various animals, such as the donkey, fox, and cat, for example, can leave trails that resemble a single line of imprints. As well, rabbits, hares, rats, and squirrels can leave hopping tracks that not only appear in a straight line but, with their four feet held together, "can form a pattern similar to a hoofmark" (Dash 1994). In any case, one newspaper reported that the tracks were "alternate of each other like the steps of a man and would be included between two parallel lines six inches apart" (Knight 1950).

I believe we can rule out hoaxed tracks like those Brown (1982) mentions at Woodbury, which he says "were obviously manufactured by practical jokers with a hot shoe, since they were said at the time to look like this, the shoe pressed cleanly down to the ground as if made by a hot iron." Surely an iron would not have remained hot for the production of many tracks, thus making the supposed method impractical; and the description seems consistent only with the effect of melting and refreezing that took place.

However, there is ample evidence, in addition to the variety of track descriptions, that multiple creatures were involved. A number of cats, for example, were responsible for many of the tracks in one village, as was explained in 1923 by a woman who had been a young girl there in 1855. As Furneaux (1977) relates:

> She recalled that the footprints were all over the town of Dawlish where her father was Vicar. He and his curates, she said, carefully examined the tracks which ran from the Vicarage to the vestry door, and came to the conclusion that they had been made by the paw-marks of many cats which had been partly washed away by the slight thaw, and expanded into the shape resembling hoofmarks by the early-morning frost. An explanation which, she says, was vehemently rejected by the townspeople who preferred to think they had been visited by the Devil himself. A widespread conviction which the Vicar of Lympstone, the Rev. Musgrave, also found himself unable to dislodge.

In another village, Torquay, a man followed a line of tracks that led from his garden to a tree stump, beneath which he discovered the putative trackmaker: a large toad! Gordon Stein (1985) has made a very good case for Devonshire foxes making many of the tracks, although he conceded they would have had difficulty scaling 14-foot walls or walking on roofs. He suggests that swans might be responsible in the latter instances, except that their footprints do not match those reported. But can we not expect that tracks on roofs, and no doubt in many other out-of-the way locations, were seen at a distance, which would have left their exact appearance to the imagination?—a collective imagination it would seem.

Clearly, as most writers on the topic agree, no one creature—not even a paranormal one—left all the reported "Devil's Footprints." As Stein (1985) points out, "When no explanation will exactly fit, either we need an additional explanation, or else some of the 'facts' may need to be discarded as weak." I suggest that we need both: We have seen that many of the alleged facts are indeed weak, and only the concept of contagion seems capable of explaining the overall case.

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SPECIAL REPORT

# How to Make an 'Alien' for 'Autopsy'

*It's easy, says a Hollywood creature effects artist. And, in fact, this is how he suspects the 'alien' body in the notorious 'autopsy' film shown on Fox was created.*

TREY STOKES

Much attention has been given to the "alien autopsy" film footage used in the "Alien Autopsy: Fact or Fiction?" program shown last summer on the Fox television network. [The black-and-white film footage was supposedly of a 1947 autopsy of one of three or four "aliens" whose spaceship was said to have crashed then near Roswell, New Mexico. See SI, November-December 1995.] Many people who saw the program seem to think that professional creature FX [FX is Hollywood jargon for "effects," as in "special effects"] artists don't know how this could be faked. I happen to be a professional creature FX artist, so let's have a look at that particular claim.

## Special Effects—The Fine Art of Fooling People

The job of a special effects artist involves: (1) Creating stuff in an attempt to fool an audience; (2) Looking at stuff other people created and trying to figure out how they did it; and (3) thinking about how we might have done that other stuff.

My opinion of the "alien autopsy"? Everything I saw in the film could have been done with modern makeup FX techniques. Many of these techniques did not exist in 1947, but my belief is that neither did this film. No theater in 1947 would have shown a film as graphic and grotesque as this, even as part of a Hollywood science fiction movie. Why would someone make a hoax the public would never see? As for another often-heard claim that this "alien corpse," if phony, would have to be the best creature effect ever put on film, well, not only do I think it's a fake, I think it could have been a much better fake.

Example of an actor being 'body cast.' (Rick Lazzarini/The Character Shop.)

And I, pardon the expression, am not alone. The FX artist seen on that program wasn't the only award-winning creature designer interviewed. A colleague of mine was also asked to review the footage for the program. He pronounced it bogus. For some reason his interview wasn't used. Since the broadcast, I've spoken to many other people who do this sort of work for a living. I have yet to find one who thinks the "alien autopsy" is anything other than a special effect.

Want to know how to do it? Okay, just don't tell anyone else. These are trade secrets.

## A Hypothetical Example

Let's suppose I was asked to create an "alien corpse" for an autopsy scene in a movie. Let's also suppose my client doesn't want to do the "ultimate" autopsy scene—just something that will be acceptable. According to the script, the movie scene will go like this: (1) This is a period piece intended to look like a forties-era documentary; (2) The body is supposed to resemble the commonly accepted "alien"description; (3) The body will be cut open and handled by the actors; and (4) We want to show nonhuman internal organs.

None of these requirements is especially difficult. I take the job. Once the check clears, I assemble my creative team. Right away, we have some important choices to make. There are two basic techniques we could use to create the original form of our corpse: sculpt the whole thing in clay, or do a body cast. Since we're doing a humanoid character, we might choose a body cast for this job. Once we have our body cast, we can adjust it in various ways to make it more "alien." Even with our adjustments, we'll still be stuck with a mostly human-looking corpse, but the body-cast method is both easier and faster than sculpting the entire alien from scratch.

The body-cast process is essentially this: We get a live human of the approximate size we need and cover him or her with alginate, an organic product that goes on like a paste but quickly solidifies into a rubbery semisolid. (You may be familiar with the stuff—dentists use it to take tooth casts.) We reinforce the alginate with layers of plaster bandage. When we remove the hardened bandages and alginate in two big sections (front and back), we've got a "negative" of our human's body. This will be the starting point for creating our alien corpse. (Many FX companies store body casts from past projects. If we happen to have an existing body cast that fits our requirements we might skip this entire step. Now that's economical!)

If we were really in a hurry we might make our final "alien" from the body cast as is; but that could lead to cosmetic problems later. The better technique is to heat up a big batch of oil clay until it becomes liquid, pour the clay into our mold, and let it cool. Pressing cold clay directly into the mold is another option, too. When we open the mold, we have an instant "sculpture," which we can resculpt until our body is exactly the way we want it. This does require us to make another mold of the finished sculpture, but the improved results will make it worth our while. The end result of our body cast is that the "alien" will have nice muscle definition and all the subtle curves and shapes of a real body.

However, we made one mistake. (Actually we try not to make this mistake—but this is hypothetical, remember?) We cast our human standing up because it was easier to get plaster bandages around the body that way. We forgot our corpse would eventually be seen on its back, something like this.

From the film.

Unfortunately, our finished body won't have real muscles under real skin, so it won't shift and react to gravity like a real body would. This is a chubby little alien we're making—if it were real, the underside of the body would lie flatter against the table. Someone looking very closely might also notice the way the flesh appears to hang sideways, toward the toes, rather than downward toward the table. And because our body-cast subject was alive, the leg muscles will be visibly tensed rather than slack, as a dead person's would be.

Oh well, it's good enough. Let's move on.

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*Trey Stokes has worked as a creature effects artist for such films as* Species, The Abyss, Batman Returns, RoboCop II, *and* The Blob.

## Creepy Alien Bits

We need to give our little "alien" friend six fingers and toes—just about the easiest possible way to take a human body and make it appear less human.

We probably didn't get very good copies of the hands and feet from our original body cast—we were trying to get the entire body shape rather than little details like that. It's possible we didn't even include the hands and feet in our original body cast since we knew we'd be replacing them later. Also, our body cast subject was standing—if we did use the original foot position, the feet would be at right angles to the legs. We can't have that—our "alien" will look like a department store mannequin that was knocked over.

Alginate being applied as the first layer of a head cast. (Rick Lazzarini/The Character Shop.)

So, we make hand and foot casts of our original subject, or anyone else whose extremities are approximately the same size. We use our clay-pour technique again to get instant hand and foot sculptures that we resculpt just a bit, adding the extra fingers and toes. (An equally acceptable method would be to sculpt new hands and feet from scratch.)

We take our finished clay extremities and attach them to our clay body, taking care to position the feet in a relaxed pose. We smooth the surface of the clay over the connections, and our "alien" body sculpture is ready.

## 'Alien' Heads and You

When it comes to making our "alien" head we have the same options as we did with our body: free-sculpture versus a resculpted cast of a human head. Again, it's a mostly human look we're going for here, so we might start with a person's head cast. Then again we might not. It really doesn't matter either way—creating creature heads is done every day in the FX biz, whether it's to create a makeup we apply to an actor, or to create a dummy head. There are many ways to go about it, depending on the artist's preference.

To go with our chubby little body, we'd probably make a chubby little head with a double chin and bags under the eyes.

And we hope this time we won't forget our "alien" will be seen on its back.

We attach the head sculpture to the rest of the body. Now our entire "alien" sculpture is finished, with the clay skin textured throughout.

## Time for the Second Mold

Because our clay model won't twitch, or breathe, or get claustrophobic, or ask to go to the bathroom, we can make a much better mold of it than we could of our original human subject. In any places where two sections of the mold come together, our "alien" body will show a seam line that will need cleaning up later. But we can be careful to construct our mold with close-fitting joints and put them in places where seams are less likely to be seen on camera.

We'd probably also use silicone rubber as the first layer of our new mold. Silicone will mirror the body's shapes and textures like alginate, but silicone won't dry and shrink like alginate does. Our new mold will last for as long as we need it, and we can refill it to make as many "alien" corpses as we want.

## A Tricky Decision

Our mold will give us an "alien" that looks good on the outside; but it has to look good on the inside, too. Otherwise we could fill the mold with plaster and start an "alien" lawn-statue business.

We want a thick, wet-looking skin, lots of blood and body fluids, and a set of internal organs. And this isn't a still-photo shoot, it's a movie—so we'd like our "alien" to move in a realistic manner as well. (Yes, it's supposedly dead, but it would be nice if our "examiners" could move it around.)

It's not difficult to build a creature that moves well. It's not difficult to build a creature that can be autopsied. It *is* difficult to build a single creature that can do both. If we design our creature with movement as our main goal, the required mechanical understructure won't leave much room for the internal organs. If we design it with the autopsy in mind, its thick skin and lack of skeletal structure will prevent it from moving very well. Huge, obvious wrinkles will appear at the joints if our actors try to move the limbs on camera.

Well, it's an autopsy movie, which effectively makes our choice for us. But it's also part of our job to work with directors and actors to help show off our effects to their best advantage. Later, on the set, we'll do our best to obscure the fact our "alien" doesn't move. (If we really wanted to do a classy job we might use our mold to build two identical bodies—one to move and one to autopsy. We'd use the first in the preliminary scenes and let the "doctors" handle it all they liked, then swap the autopsy version for the later scenes. Maybe next time.)

## Thick-Skinned 'Alien'

We need space inside our "alien" for the abdominal organs and brain. To do this we suspend a "core" inside our mold: a plaster blob shaped to fit neatly inside the torso and head. We place our core to allow the proper amount of air space between it and the interior surface of the mold. When we fill the mold, this air space will become the skin we cut through to get to the organs. (We don't need a core for the arms and legs; we'll just

let them fill up with our skin material since we've already decided not to bother making them posable.)

We have several options for skin material. A silicone or gelatin mix will give our "alien's" skin a nice "fleshy" quality, if we don't mind the added expense and complexity. Foam latex, a special mixture that expands to form foam rubber, would give us a body that is soft and spongy with a semirealistic simulation of real flesh. Somewhat tricky to use, it also requires an oven large enough to bake our entire mold overnight. Polyfoam, a self-rising urethane similar to foam latex but less expensive and with no overnight baking required, is quick and cheap. And our "alien" will look quick and cheap, too, unless we're very careful!

All of these are workable solutions, subject to our budget, deadline, and personal preference. If the budget allows, we'd probably spring for the silicone skin: It cuts well, looks real, and paints easily.

Just before we close the mold and inject our chosen filling, we may want to add a bit of structure to certain areas. For example, we could embed some wire into the fingers to make them posable. (This will mean we can't move the fingers on camera.) We inject our mold with our chosen filling and wait for it to set.

A completed sculpture of Casper the ghost being molded in fiberglass. (Rick Lazzarini/The Character Shop.)

## Opening the Mold

We open the mold—voila! An "alien." We cut into the "alien corpse's" back and remove the core, leaving a hollow space for our "alien" guts.

The head requires a little extra attention because we want to peel back the skin and reveal a skull. We're not really going to see very much of this in our final film so all we need to do is put a solid shape—most likely made of plaster or fiberglass—into the hollow left behind by the core. In fact, we'd probably use a duplicate of our core to ensure an exact fit. If we had a bigger budget we might go as far as an articulated underskull with a hinged jaw and eyelids and so on, so our "examiner" could fiddle with the eyes and mouth during the examination. Maybe next time.

We trim and patch the body's seam lines where needed. We give our little friend a quick paint job—it doesn't have to be very detailed because we already know this dummy will only be seen in grainy black-and-white.

We stick oversized eyes in our head and put some sort of film over them. We'll be removing this covering as part of our "autopsy." It won't make a lot of sense, but it'll be icky!

We're done.

Oh, almost done. Let's tear out some of the material on the right thigh, paint a bit of blood on it, and create a big, ugly "wound." Should take an extra half hour or so.

## Final Touches

We bring our body to the set. Just before filming, we reach through the opening in the corpse's back and paint the interior with blood and goo. Then we put our internal organs into place. Maybe we made some beforehand, maybe we bought some livers and kidneys at the market, or both. We seal the opening (it doesn't have to be a cosmetically perfect job—we'll never see the "alien's" back!) and roll the body over. A few drops of glycerin to make her eyes realistically moist, and she's ready!

Our human actors are ready, too, but first we have to give them some coaching. Because of the way we built our creature, they can't move it at all. They shouldn't attempt to raise the arms or legs, rotate the head, or shift the body. In fact, they can only touch it in the most delicate manner or it will become obvious the "flesh" is nearly solid and not semi-liquid like real flesh.

Okay, our actors are up to speed now. Let's shoot this thing.

Roll 'em!

First, we get our "establishing" shots of our critter. We have our actors move around, look at the dummy, point to it, and nod. Then we get a few shots in which they pantomime handling the creature. If they do it correctly, it won't be obvious they're barely touching it. (Not many people are aware of the way real bodies in real autopsies are twisted, turned, and flopped this way and that, so they won't realize how bizarre this "examiner" behavior is.)

While we're at it, we'll try a few close-ups where our actors very carefully move the leg and the hand slightly by gripping them firmly and moving them very slightly, just to the point where the skin would start to fold and wrinkle.

## Now We Open Her Up

Now it's time to cut into the body. Here we employ one of the oldest tricks in the book. We take our scalpel and attach a small tube to the side facing away from the camera. As the actor pulls the scalpel along the dummy, we pump a bit of blood through the tube. The scalpel leaves a line of fresh blood. And if some of the blood we put inside the body leaks through the cut, that's even better!

Our next step is to pull back the skin and reveal the abdominal cavity. But first, a brief pause. Until we open the chest, we can't be sure our body interior looks properly realistic. So we tell everyone to take a break while we open the skin of the chest and "dress" the interior—adding any needed blood or details. Then we bring our actors back in and film them as they pantomime peeling the prepared skin with their cutting tools.

This leaves us with a "missing" scene between the original incision and the skin peeling already in progress. But it's a *minor omission—and it covers a multitude of possible sins.*

After our skin-peeling scene, we can arrange our organs as needed before we roll the camera again.

Our shaky, soft-focus cinematography should help hide the fact that we're looking at a random pile of disconnected organs. Now we can get loads of film of our actors as they remove these "organs" one by one.

### Let's See Some Brains

Now for our big finish we'll cut the "skull" open. We didn't *spend a lot of time on our skull, but we'll do this in short takes* from various bad angles so there's plenty of opportunity to adjust things as we go.

First, we use our blood-tube scalpel on the scalp. We cheat just a bit and skip the moment where the skull is first exposed to allow for any needed touchup work, then let our actors peel the scalp back. We give our actor a saw and let him grind away on the underskull for a while.

Skipping the actual removal of the skull cap, we shoot the removal of the brain from a low angle where the skull can't be seen. We throw one of our organs in there and roll camera as the organ oozes out.

And that's our big finish. Any questions?

*Are you sure that's how the "autopsy" was done?* Pretty sure. If not precisely the way I've described it, then something close to it.

*Does this prove the film is a fake?* Well, no. Although there isn't a single moment that doesn't appear to be faked, it's possible the film is genuine and all the flaws can be explained.

*Which of the following is a more plausible scenario? (1) This film depicts an actual autopsy of a real "alien" whose body is constructed so exactly like a Hollywood-style creature effect that professional creature FX artists can't tell the difference; and the film itself happens to have been filmed in exactly the way a Hollywood-style scene would be shot, accidentally omitting dozens of details that would have made the film far more believable—or, (2) This film depicts a staged autopsy of a Hollywood-style creature effect.*

Until better evidence comes along, I'm choosing the second option. □

# A Surgeon's View:

## Alien Autopsy's Overwhelming Lack of Credibility

JOSEPH A. BAUER, M.D.

The remarkable aspect of the alleged Roswell alien saucer crash is that in nearly 50 years of tenacious efforts to legitimize the *event by scores of believers and supposed witnesses and participants*, not a single, solitary bit of tangible, credible evidence has been found to support such a fantastic and significant event. Despite the reports of extensive debris found in the field at this alleged crash site; despite the many who allegedly handled material fragments with amazing qualities; despite hearsay that the alien bodies and craft were spirited away with unheard-of government efficiency and conspiratorial secrecy to locations that remain mysterious and unproven; despite all these exceedingly unlikely occurrences, no one has surfaced with a hint of convincing, supportive evidence; not even a tiny piece of that mysterious material scattered so widely and handled by so many has surfaced for examination. Didn't anyone slip a fragment into his or her pocket? And now, perhaps to mark the event's upcoming 50th anniversary, someone is apparently trying again to prove this was really an extraterrestrial event—this time with an alien autopsy film.

*Joseph A. Bauer is a surgeon in Cleveland, Ohio, and a member of South Shore Skeptics.*

I recognize that it is far easier to create a hoax than to *unmask* one. *But* the question "Why?" effectively *exposes the bizarre scenarios depicted* in the autopsy film *as blatant fabrications.*

Why introduce a film now, when alleged mortal fear of repercussions from the government supposedly silenced all witnesses for decades? If the film is authentic, why didn't someone cash in on it in a big way, decades ago, selling it to the highest bidder in a worldwide auction by an agent assuring anonymity of the source? Other than placing a period clock and telephone in the scene, why didn't the filmmaker use some rudimentary special effects to give the autopsy scenario at least the appearance of being *more* than the *clumsy* gropings *of veiled, amateur actors impersonating medical investigators?*

Considering that an alien autopsy would have been a unique event, the maker of this film should have attempted at least to give the appearance of the event *being* authentic and credible. Why not use a group of actors trained in instrument handling? Why not progress through a systematic autopsy process, rather than just slash and cut out viscera? And wouldn't it have been better to show the need to take many days or weeks to unravel and comprehend the allegedly unrecognizable, misplaced internal organs? But none of these essential procedures was observed, indicating that the autopsy was not authentic, but was contrived by low budget, poorly advised nonprofessionals.

There was no systematic progression of the autopsy, starting from a careful examination *and* penetration of organs and orifices, particularly since alien lore predicates extraordinary eyes, lack of ears or hearing, imperforated oral cavities and questionable need for gastrointestinal tracts, and no genital or anal structures. Next, skilled unroofing of the body cavities would have been followed by surgically precise and detailed

dissection, delineating interrelationships, continuity, and formations of the various unknown internal organ systems, during which time decomposition of the body would need to be prevented by some preservation or embalming process. Indeed, there might have been a rare—no, *unprecedented* and *unparalleled*—opportunity to study an alien corpse; but it was not an autopsy that was needed, but rather, a systematic, lengthy, detailed, precise, anatomic dissection and microscopic study of a well-preserved body by a team of specialists of the various, presumably strange, organ systems. No less than that was done in the initial evaluations of the newly discovered Coelocanths. (When a carcass of this primitive fish, thought to be extinct, was first dredged from the depths of the Indian Ocean off Madagascar, ichthyologists worldwide were involved in its dissection, study, and preservation.)

Instead, the dramatic and graphic autopsy—performed with far less diligence and skill than a routine autopsy—was staged by the filmmaker in two scenes. First, the anonymous, hooded figures stand around ineptly trying to occupy their hands, clearly devoid of the rudimentary skills of manual examination of a body, generally expected of any physician, clinical pathologist, or other medical professional. This is followed by tentative, insecure incising, with the operator's face peering down close to the body from which he or she wants to be shielded by wearing the protective suit. Scene two shows the body open; the same inexperienced, unskilled hands are groping around randomly and unsystematically, and without efforts to recognize or analyze organ structures, relationships, or continuity. The bizarre body contents are blindly chopped out and tossed into pans. Ironically, since the external body structure appears so humanlike, the real question is, why should these internal organs be so unrecognizable?

An autopsy is done to determine a disease process, a deviation from the norm, or the cause of death. When the norm is unknown, as would be the case with an alien body, then a careful anatomic dissection is needed with frequent samples being taken for microscopic examination. Anatomical dissection consists of precise steps of delineation, tracing the continuity and relationship of each fold, loop, or bulge to adjacent structures, particularly if the anatomy is unknown and unrecognized as claimed here.

This poorly performed autopsy may have botched a golden opportunity to learn much about this corpse. But it is consistent with an ill-designed hoax. Observation of how ineptly the instruments are held and used is also revealing, and distinguishes a skilled medical professional from an actor. Scissors, for example, are not held with the forefinger and thumb *awkwardly pointing off sideways,* as was done in the film. Instead, the ring finger and thumb are placed in the scissors' holes, the *middle finger stabilizes, and the index finger is used to direct the scissor tip precisely.* Dissection should be done with judicious irrigation and sponging of obscuring fluids (none was seen in the film); dissection is done with direct vision of the knife or scissor points and not by blindly cutting, as depicted. The chopping out and removal of body contents would have totally distorted the functional and structural relationships of organs and destroyed the functional anatomy.

The peculiar headgear of these hooded operators is also enigmatic. Presumably, the hoods were intended to protect against microbes, vapors, or other alien toxins. But as shown, the hoods would cause rapid asphyxia from anoxia and accumulation of exhaled carbon dioxide. Where are the pumps and hoses necessary to supply fresh air to the operators? Without a circulating air supply, the visors would also have become rapidly fogged by condensation, and vision would be obscured. The lack of a detectable air supply suggests that the hoods used for this film were sufficiently porous for air exchange to occur freely, and thus would provide no protection against toxic gases or microbial contagion. All these observations are also most consistent with an ill-designed theatrical mock-up, rather than an actual autopsy of a potentially contagious, decomposing, alien corpse.

The mode of photographic documentation also raises countless questions: Why did a professional photographer repeatedly, if not intentionally, go out of focus and usually position himself or herself behind the actors to obscure the view at the most crucial moments—such as when the cranium (head) was opened? Why was the removal of the skullcap not seen, nor the *in situ* appearance of the brain? Why was a movie camera chosen for documentation (since movie cameras were known to have a focus problem) when efficient 35 mm still cameras with close-up lenses and color film were available at the time and commonly used for medical/surgical/pathological documentation? Furthermore, why was the camera operator allowed to take away and keep a film, when, according to testimony presented, an otherwise high level of secrecy was exercised and enforced with mortal threats? Why did the camera operator not ship this roll back to the military, as he or she did with the other rolls of film, instead of notifying the military to pick it up; and why did the military—incredibly—allow the camera operator to keep this top secret film? Of course a movie camera poorly focused and poorly positioned would be the choice of someone intending to tantalize, mislead, and not reveal any information in the course of hoax.

Only two conclusions are possible from this film: Either this is the work of beginners attempting to create a hoax to resuscitate the corpse of Roswell crash lore; or, if the film is intended to portray an actual autopsy of an unusual humanoid body (a proposition untenable and *entirely* unsubstantiated), then it is a documentation of the crime of the millennium—the brutal butchery, devastation, and destruction of unique evidence and an unparalleled opportunity to gain some understanding about this deformed creature, regardless of its origin.

I hope that this critique will not guide someone to produce a more believable alien autopsy film. □

# EMDR Treatment: Less Than Meets the Eye?

*Eye movement desensitization and reprocessing has been hailed by many as a major breakthrough in the treatment of post-traumatic anxiety. It rests on a surprisingly weak foundation of research evidence.*

SCOTT O. LILIENFELD

"Quick fixes" for emotional maladies have struck a responsive chord in the general public, as biopsychologist B. L. Beyerstein (1990) has noted. Because these interventions often hold out the hope of alleviating long-standing and previously intractable problems with a minimum of time and effort, they are understandably appealing to both victims of psychological disorders and their would-be healers.

More often than not, however, the initial enthusiasm generated by such treatments has fizzled as soon as their proponents claims have been subjected to intensive scrutiny. In the case of certain highly touted techniques such as neurolinguistic programming (Druckman and Swets 1988), subliminal self-help tapes (Moore 1992; Pratkanis 1992), and facilitated communication for autism (Mulick, Jacobson, and Kobe 1993), controlled studies overwhelmingly indicate that

Tom Cheek/Stock, Boston.

The well-known technique of using alternating eye movements to induce hypnosis finds its modern incarnation in the eye movements of EMDR.

early reports of their effectiveness were illusory. In other cases, such as biofeedback for psychosomatic disorders, there is some limited evidence for efficacy, but scant evidence that this efficacy exceeds that of less expensive and less technologically sophisticated treatments (Druckman and Swets 1988). The benefits of biofeedback, for example, are not demonstrably greater than those of relaxation training (Silver and Blanchard 1978).

In the past few years, a novel and highly controversial treatment known as "eye movement desensitization and reprocessing" (EMDR) has burst onto the psychotherapy scene. EMDR has been proclaimed by its advocates as an extremely effective and efficient treatment for Post-Traumatic Stress Disorder (PTSD) and related anxiety disorders. These assertions warrant close examination because PTSD is a chronic and debilitating condition that tends to respond poorly to most interventions.

Although PTSD was not formally recognized as a mental disorder until 1980, descriptions of "shell shock," "battle fatigue," and similar reactions to wartime trauma date back at least to the late nineteenth century (Barlow 1988). PTSD is defined by the American Psychiatric Association (1994, p. 427) as an anxiety disorder resulting from exposure to "an event...that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others." Among the most frequent precipitants of PTSD are military combat, rape, physical assault, motor vehicle accidents, natural disasters, and the witnessing of a murder or accidental death. The primary symptoms of PTSD fall into three categories: (1) psychological reexperiencing of the traumatic event (e.g., recurrent and disturbing flashbacks and dreams of the event); (2) avoidance of stimuli (e.g., television programs, conversations) that remind the individual of the event; and (3) heightened arousal (e.g., sleep disturbances, increased startle responses).

Although PTSD is difficult to treat, there is accumulating evidence that "exposure treatments," which involve confronting clients with memories and images of the traumatic event, are effective for many cases of PTSD (Frueh, Turner, and Beidel 1995). One of the best known of such interventions is "flooding," in which clients are exposed to trauma-related stimuli for prolonged time periods (often two hours or more) until their anxiety subsides. Flooding can be performed using either real-life stimuli or visual imagery, although the inability to recreate the actual details of the traumatic scene typically means that the treatment must be conducted imaginally. The mechanisms underlying the success of exposure techniques are still a subject of debate, but many psychologists believe that the effective ingredient in such treatments is "extinction"—the process by which a response dissipates when the stimulus triggering this response is presented without the original emotional concomitants.

Despite their advantages, exposure treatments for PTSD tend to provoke extreme anxiety and consume much time. Often 20 sessions are required for maximal efficacy (Frueh et al. 1995). As a result, many clients with PTSD are reluctant to undergo such treatments, leading some practitioners to search for less stressful and more time-efficient interventions. Enter EMDR.

## EMDR: Method, Rationale, and Claims

Francine Shapiro, the psychologist who originated EMDR, recalls having fortuitously "discovered" this technique when she found that rapid back-and-forth eye movements reduced her own anxiety (Shapiro 1989b). Shapiro thereafter applied this procedure to her own clients with anxiety disorders and claims to have met with remarkable success. Since the initial published report of its use in 1989, EMDR has skyrocketed in popularity among practitioners. As of mid-1995, approximately 14,000 therapists were licensed to perform EMDR in the United States and other countries (Bower 1995), and this number is growing. EMDR is also attracting international

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attention. For example, a team of American psychologists recently trained 40 European therapists to administer EMDR to victims of war trauma in Bosnia (Cavaliere 1995).

Although EMDR is alleged to be a complicated technique that requires extensive training (Shapiro 1992), the treatment's key elements can be summarized briefly. Clients are first asked to visualize the traumatic event as vividly as possible. While retaining this image in mind, they are told to supply a statement that epitomizes their reaction to it (e.g., "I am about to die"). Clients are then asked to rate their anxiety on a Subjective Units of Distress (SUDs) scale, which ranges from 0 to 10, with 0 being no anxiety and 10 being extreme terror. In addition, they are told to provide a competing positive statement that epitomizes their *desired* reaction to the image (e.g., "I can make it"), and to rate their degree of belief in this statement on a 0 to 8 Validity of Cognition scale.

Following these initial steps, clients are asked to visually track the therapist's finger as it sweeps rhythmically from right to left in sets of 12 to 24 strokes, alternated at a speed of two strokes per second. The finger motion is carried out 12 to 14 inches in front of the client's eyes. Following each set of 12 to 24 strokes, clients are asked to "blank out" the visual image and inhale deeply, and are then asked for a revised SUDs rating. This process is repeated until clients' SUDs ratings fall to 2 or lower and their Validity of Cognition ratings rise to 6 or higher.

Although EMDR technically requires the use of eye movements, Shapiro (1994a) claimed that she has successfully used the technique with blind clients by substituting auditory tones for movements of the therapist's finger. Recently I attended a presentation on EMDR given by a clinician who reported that, when working with children, he uses alternating hand-taps on the knees in lieu of back-and-forth finger movements.

Since its development, EMDR has been extended to many problems other than PTSD, including phobias, generalized anxiety, paranoid schizophrenia, learning disabilities, eating disorders, substance abuse, and even pathological jealousy (Beere 1992; Marquis 1991; Shapiro 1989b). Moreover, Shapiro (1991, p. 135) asserted that "EMDR treatment is equally effective with a variety of 'dysfunctional' emotions such as excessive grief, rage, guilt, etc." The theoretical rationale for EMDR has not been clearly explicated by either Shapiro or others. Indeed, a recent attempt by Shapiro (1994b, p. 153) to elaborate on EMDR's mechanism of action may mystify even those familiar with the technique: "The system may become unbalanced due to a trauma or through stress engendered during a developmental window, but once appropriately catalyzed and maintained in a dynamic state by EMDR, it transmutes information to a state of therapeutically appropriate resolution." Shapiro has further conjectured that the eye movements of EMDR are similar to those of rapid eye movement (REM) sleep. Because there is evidence from animal studies that REM sleep is associated with the processing of memories (Winson 1990), Shapiro has suggested that the eye movements of EMDR may similarly facilitate the processing of partially "blocked" memories. Because there is no evidence that EMDR produces brain changes resembling those occurring during REM sleep, however, the analogy between the eye movements of EMDR and those of REM sleep may be more superficial than real.

EMDR has been hailed by its advocates as a novel treatment that produces much faster and more dramatic improvements than alternative treatments. Shapiro (1989b), for example, asserted that EMDR can successfully treat many or most cases of PTSD in a single 50-minute session, although especially severe cases may require several sessions. Moreover, claims for EMDR's efficacy have not been limited to Shapiro. Psychologist Roger Solomon (1991, cited in Herbert and Mueser 1992) described EMDR as "a powerful tool that rapidly and effectively reduces the emotional impact of traumatic or anxiety evoking situations." Beere (1992, p. 180) reported "spectacular" results after using EMDR on a client with multiple personality disorder.

**"Does not the spirit of open scientific inquiry demand that the proponents of a novel technique remain agnostic regarding its efficacy pending appropriate data?"**

Similar reports of EMDR's sensational effectiveness have appeared in the media. On July 29, 1994, ABC's "20/20" newsmagazine show aired a segment on EMDR. Host Hugh Downs introduced EMDR as "an exciting breakthrough . . . a way for people to free themselves from destructive memories, and it seems to work even in cases where years of conventional therapy have failed." Downs stated, "No one understands exactly why this method succeeds, only that it does." The program featured an excerpt from an interview with Stephen Silver, a psychologist who averred, "It (EMDR) leads immediately to a decrease in nightmares, intrusive memories, and flashback phenomena. It is one of most powerful tools I've encountered for treating post-traumatic stress" (ABC News 1994).

Although based largely on unsystematic and anecdotal observations, such glowing testimonials merit careful consideration. Are the widespread claims for EMDR's efficacy substantiated by research?

## Uncontrolled Case Reports

Many uncontrolled case reports appear to attest to the efficacy of EMDR (e.g., Forbes, Creamer, and Rycroft 1994; Lipke and Botkin 1992; Marquis 1991; Oswalt, Anderson, Hagstrom, and Berkowitz 1993; Pellicer 1993; Puk 1991; Spates and Burnette, 1995; Wolpe and Abrams, 1991). All of these case reports utilize a "pre-post design" in which clients are treated with EMDR and subsequently reassessed for indications of improvement. These case reports, although seem-

## Similarities of EMDR to Other Treatments

Although EMDR is of recent origin, the seeds of many of its therapeutic components can be found in much earlier treatment methods. At least some of EMDR's intuitive appeal might derive from its superficial similarity to another technique that has long captured the fascination of the general public: hypnosis (Gastright 1995). James Braid, the nineteenth-century eye doctor and surgeon who is generally credited with coining the term *hypnosis,* also introduced the technique of optical fixation (sometimes referred to as the "Braid effect") to induce the hypnotic state. In one familiar variation, the hypnotist rhythmically swings a watch on a chain or other pendulous object in front of the patient, who is asked to visually track its movement.

Interestingly, Braid discovered that moving this object was not needed to induce hypnosis; a stationary fixation point worked equally well. EMDR, like Braid's induction technique, involves the use of alternating eye movements. The eye movements associated with EMDR, like those in hypnotic induction, may well be superfluous (Renfrey and Spates 1994). Braid, like many advocates of EMDR, perceived deep-seated commonalities between the processes occurring during therapy and the phenomenon of sleep. Indeed, Braid believed that the eye movements associated with hypnotic induction produce a sleeplike state, which he termed hypnosis ("hypno" is Greek for "sleep") (Rowley 1986).

EMDR also bears certain similarities to neurolinguistic pro-

ingly supportive of EMDR, are for several reasons seriously flawed as persuasive evidence for its effectiveness.

First, case reports, probably even more than large controlled investigations, are susceptible to the "file drawer problem" (Rosenthal 1979)—the selective tendency for negative findings to remain unpublished. It is impossible to determine the extent to which the published cases of EMDR treatment, which are almost all successful, are representative of all cases treated with this procedure.

Second, in virtually all of the published case reports, EMDR was combined with other interventions, such as relaxation training and real life exposure (Acierno, Hersen, Van Hasselt, Tremont, and Meuser 1994). As a result, one cannot determine whether the apparent improvement reported in such cases is attributable to EMDR, the ancillary treatments, or both.

Third, and most important, these case reports cannot provide information regarding cause-and-effect relations because they lack a control group of individuals who did not receive EMDR. The ostensible improvement resulting from EMDR in these reports may be due to numerous variables other than EMDR itself (Gastright 1995), such as placebo effects (improvement resulting from the expectation of improvement), spontaneous remission (natural improvement occurring in the absence of treatment), and regression to the mean (the statistical tendency of extreme scores at an initial testing to become less extreme upon retesting). Consumers of uncontrolled case reports thus must be chary of falling prey to the logical fallacy of *post hoc, ergo propter hoc* (after this, therefore because of this): Only in adequately controlled studies can improvement following EMDR treatment be unequivocably attributed to the treatment itself.

### Controlled Studies

Despite abundant claims for EMDR's efficacy, few controlled outcome studies on EMDR have been conducted. They are of two major types: (1) between-subject designs, in which subjects are randomly assigned to either a treatment or a control group; and (2) within-subject designs, in which subjects serve as their own control.

### Between-Subject Designs

In the first controlled investigation of EMDR, Shapiro (1989a) randomly assigned 22 individuals who had experienced a traumatic event to either an EMDR treatment group or an exposure control group. In the latter condition, subjects were provided with imaginal exposure to the trauma, but without the eye movements involved in EMDR. Shapiro reported that after only one session, EMDR subjects exhibited significantly lower SUDs levels and significantly higher Validity of Cognition ratings than subjects in the control group. The control group subjects showed essentially no improvement on either measure.

Superficially, these findings seem to provide impressive support for the effectiveness of EMDR. Even a casual inspection of the study's methodology, however, reveals serious deficiencies in experimental design (Acierno et al. 1994; Herbert and Mueser 1992). First, Shapiro herself conducted both treatments and elicited the SUDs and Validity of Cognition ratings from subjects in both groups. Because Shapiro knew the subjects' treatment condition, her findings are potentially attributable to the well-documented experimenter expectancy effect (Rosenthal 1967)—the tendency for researchers to unintentionally bias the results of their investigations in accord with their hypotheses. Specifically, Shapiro might have unwittingly delivered treatment more effectively or convincingly to the EMDR group, or subtly influenced subjects in this group to report greater improvement. Second, the cessation of traumatic imagery was contingent on low SUDs ratings in the EMDR group, but not in the imaginal exposure group (Lohr, Kleinknecht, Conly, Cerro, Schmidt, and Sonntag 1992). It is therefore possible that subjects in the EMDR group reported low SUDs ratings in order to terminate this aversive imagery. Moreover, the total amount of exposure in the two groups may have differed (Lohr et al. 1992). These methodological shortcomings render the results of Shapiro's study (Shapiro 1989a) virtually uninterpretable.

Since this initial report, a number of investigators have attempted to replicate Shapiro's methodology of comparing EMDR with an imaginal exposure control

condition for clients with PTSD or other anxiety disorders. Several of these researchers used a "dismantling" design in which EMDR was compared with an otherwise identical procedure minus the eye movements; in this design certain components of the treatment that are purported to be effective (in this case, eye movements) are removed from the full treatment package to determine if their omission decreases therapeutic effectiveness. Renfrey and Spates (1994), for example, compared EMDR with an imaginal exposure condition in which subjects stared at a stationary object.

In virtually all of these investigations, EMDR was not consistently more effective than the exposure control condition, although both conditions appeared to produce improvements on some measures. In one study (Boudewyns et al. 1993), EMDR was found to be more effective than the control condition, but only when within-session SUDs ratings were used. In this investigation, however, as in Shapiro's study (1989a), cessation of the traumatic scene was contingent on low SUDs ratings in the EMDR condition only, so this finding may again reflect the subjects' desire to terminate exposure to unpleasant imagery. Interestingly, SUDs ratings obtained outside of sessions in response to audiotaped depictions of clients' traumatic experiences indicated no differences between conditions. Moreover, physiological reactions (e.g., heart rate increases) to these depictions showed no improvement in either condition.

Sanderson and Carpenter (1992), who administered EMDR and imaginal exposure in counterbalanced order, found that EMDR and imaginal exposure yielded equivalent improvements (using SUDs ratings taken outside of treatment sessions) but that EMDR was effective only when preceded by imaginal exposure. Renfrey and Spates (1994, p. 238) reported that EMDR was no more effective than a control procedure involving fixed visual attention, leading them to conclude that "eye movements are not an essential component of the intervention."

Only one published study has directly compared EMDR with a no-treatment control group. Jensen (1994) randomly assigned Vietnam veterans with PTSD to either an EMDR group or a control group that was promised delayed treatment. EMDR produced lower within-session SUDs ratings compared with the control condition, but did not differ from the control condition in its effect on PTSD symptoms. In fact, the level of interviewer-rated PTSD symptoms *increased* in the EMDR group following treatment.

## Within-Subject Designs

Three teams of investigators have used within-subject designs to examine the efficacy of EMDR. Acierno, Tremont, Last, and Montgomery (1994) treated a client with phobias of dead bodies and the dark using both EMDR and "Eye-Focus Desensitization," the latter identical to EMDR except that the therapist's finger remained stationary. In the case of the client's fear of dead bodies, EMDR was administered first; in the case of the client's fear of the dark, Eye-Focus Desensitization was administered first. EMDR showed little or no advantage over the control procedure on self-report, physiological, or behavioral measures, the last of which involved assessments of the client's willingness to approach feared stimuli.

In contrast, Montgomery and Ayllon (1994a) reported that EMDR yielded significant decreases in SUDs levels and client reports of PTSD symptoms, whereas a control procedure consisting of EMDR minus eye movements did not. These two procedures were not, however, administered in counterbalanced order; the control procedure was always presented first. Consequently, the improvements following EMDR may have been due to a delayed effect of the control procedure. Alternatively, they might have resulted from the cumulative effect of the exposure provided by both procedures, regression to the mean effects, or to other factors unrelated to EMDR. EMDR did not produce improvements on physiological indices (heart rate and systolic blood pressure).

Finally, Montgomery and Ayllon (1994b) treated a client with PTSD who had experienced two distinct traumatic events (a car accident and an assault at knifepoint). EMDR was applied separately to the memories of each event. EMDR appeared to show beneficial effects on sub-

*gramming (Bandler and* Grinder 1975), in which the client's eye movements and visual imagery both play a pivotal role. The developers of neurolinguistic programming claimed that their procedure could cure anxiety disorders (e.g., phobias) in as little time as 20 minutes. Like the claim that EMDR can alleviate most PTSD symptoms in a single session, credible evidence for this neurolinguistic programming assertion has yet to be presented (Druckman and Swets 1988).

In his classic book *Persuasion and Healing: A Comparative Analysis of Psychotherapy,* Jerome Frank (1973) posited that all psychotherapies share certain nonspecific ingredients that account for their effectiveness in combatting distress. These common ingredients, although often denigrated as "placebo" factors, are posited by Frank to be essential to therapeutic efficacy. Among these factors are what Frank termed therapeutic procedures or rituals: highly specialized techniques that, although not in and of themselves necessarily effective, help to inspire the confidence of both client and therapist and provide a rationale for treatment. Frank contended that these procedures, of which the free association method of the psychoanalyst and the induction procedure of the hypnotist are exemplars, are akin to the ceremonial rites of faith healers in that they cultivate the impression that deeply mysterious and significant changes are occurring. In many respects, the eye movements and other *accoutrements of EMDR can similarly* be viewed as therapeutic rituals that, although perhaps not directly relevant to therapeutic success, may foster clients' and therapists' faith in their chosen method of healing. □

jective distress, although the degree of improvement was much less than that reported by Shapiro (1989a). Because EMDR was not compared with a control procedure involving imaginal exposure, its unique effects cannot be ascertained.

## The Verdict

Because of the paucity of adequately controlled studies on EMDR, it would be premature to proffer any definitive conclusions regarding its effectiveness. Nevertheless, the following assertions are warranted on the basis of the evidence.

1. Although a multitude of uncontrolled case reports seemingly demonstrate that EMDR produces high success rates, these reports are open to numerous alternative explanations and thus do not provide compelling evidence for EMDR's effectiveness.

2. Controlled studies provide mixed support for the efficacy of EMDR. Most of the evidence for EMDR's effectiveness derives from clients' within-session ratings (which in some cases may be influenced by the desire to terminate exposure), but not from more objective measures of improvement. There is no evidence that EMDR eliminates many or most of the symptoms of PTSD in one session.

3. There is no convincing evidence that EMDR is more effective for post-traumatic anxiety than standard exposure treatments. If EMDR works at all, it may be because it contains an exposure component (Steketee and Goldstein 1994). The proponents of EMDR have yet to demonstrate that EMDR represents a new advance in the treatment of anxiety disorders, or that the eye movements purportedly critical to this technique constitute anything more than pseudoscientific window dressing.

**"Assertions about the utility and validity of psychological techniques . . . must answer to a commonsense demand: 'Show me.' EMDR has thus far failed to convincingly pass the 'Show me' test."**

Thus, the most justified conclusion concerning EMDR's effectiveness is: Not proven. Nonetheless, many proponents of EMDR remain convinced that the treatment utility of EMDR will ultimately be demonstrated. Shapiro (1992, p. 114), for example, opined, "When the efficacy of EMDR is fully established, I would like to see it taught in the universities. When that happens, three-hour workshops on specialized applications of EMDR will undoubtedly be offered. . . ." These statements, which were made after approximately 1,200 licensed therapists had already received formal training in EMDR (Shapiro 1992), raise troubling questions. Should not the efficacy of a therapeutic technique be established *before* it is taught to clinicians for the express purpose of administering it to their clients? Moreover, does not the spirit of open scientific inquiry demand that the proponents of a novel technique remain agnostic regarding its efficacy pending appropriate data, and that the two sentences quoted above should therefore begin with "if" rather than "when?"

## Concluding Comments

Dawes (1994) has argued that assertions about the utility and validity of psychological techniques, like assertions in all areas of science, must answer to a commonsense demand: "Show me." EMDR has thus far failed to convincingly pass the "Show me" test. Claims for its efficacy have greatly outstripped its empirical support. Although Shapiro has suggested that "there is more to EMDR than meets the eye" (1994b, p. 155), a skeptical consumer of the literature might well be tempted to draw the opposite conclusion.

Moreover, because EMDR has not been clearly shown to be beneficial for the condition for which it was originally developed, namely PTSD, its extension as a treatment for schizophrenia, eating disorders, and other conditions is even more premature and ethically problematic. Furthermore, both scientific and logical considerations dictate that the developers of a treatment should specify the boundary conditions under which this technique is and is not effective. Because EMDR purportedly facilitates the processing of traumatic memories, one would not expect it to be useful for conditions (e.g., schizophrenia) in which severe emotional trauma has not been found to play a major causal role. Indeed, claims that EMDR is helpful for such conditions (Marquis 1991) actually call into question the presumed mechanisms underlying EMDR's mode of action. So far, however, the proponents of EMDR have made little or no effort to delineate the boundary conditions of their method's effectiveness. Moreover, the assertion that EMDR works equally well with auditory tones and hand-taps as with eye movements (Shapiro 1994a) runs counter to Shapiro's theoretical conjectures regarding EMDR's commonalities with REM sleep.

Although further research on EMDR is warranted, such research will likely be impeded by the prohibitions placed on the open distribution of EMDR training materials (Acierno et al. 1994). For example, participants in EMDR workshops must agree not to audiotape any portion of the workshop, train others in the technique without formal approval, or disseminate EMDR training information to colleagues (Rosen 1993). It seems difficult to quarrel with Herbert and Meuser's (1992, p. 173) contention that although "this procedure is justified to maintain 'quality control,' such a restriction of information runs counter to the principle of open and free exchange of ideas among scientists and professionals."

Because of the limited number of controlled studies on EMDR, both practitioners and scientists should remain open to the possibility of its effectiveness. Nevertheless, the standard of proof required to use a new procedure clinically should be considerably higher than the standard of proof required to conduct research on its efficacy. This is particularly true in the case of such conditions as PTSD, for which existing treatments have already been shown to be effective. The continued

case of such conditions as PTSD, for which existing treatments have already been shown to be effective. The continued widespread use of EMDR for therapeutic purposes in the absence of adequate evidence can be seen as only another example of the human mind's willingness to sacrifice critical thinking for wishful thinking.

## Note

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# Edgar Cayce: The 'Prophet' Who 'Slept' His Way to the Top

*Known as the 'Sleeping Prophet,' Edgar Cayce was in the headlines for going into sleeplike trances to make predictions and dispense medical advice. He kept his own scorecards. Are they evidence of success, or merely anecdotes?*

DALE BEYERSTEIN

Known as "The Sleeping Prophet" after a biography of him by that title became popular (Stern 1967), Edgar Cayce (1877-1945) for 42 years gave "medical readings" while in a trance that diagnosed people's supposed illnesses, and for 19 years gave "life readings" that traced followers' past lives and made predictions for their futures. Some of these readings also predicted world events.

During most of his career, Cayce's (pronounced KAYsee) often rambling discourses were recorded by a stenographer. Although Cayce took directions from others in the room

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who "controlled" the reading and responded to questions and suggestions, he claimed that he never remembered anything from his trances upon awakening. However, Stern (1967) maintains that the common belief that Cayce was psychic only in this trance state is false. He claims that Cayce, when awake, constantly saw auras surrounding people and could clairvoyantly read through the backs of playing cards, although these supposed abilities were never tested under scientifically controlled conditions.

Cayce was aware of the "Poughkeepsie Seer," Andrew Jackson Davis of Poughkeepsie, New York, and Cayce's sessions resembled those of that mid-nineteenth-century "wonder" more and more as Cayce got older. Cayce's purported paranormal powers were confined to the clairvoyance involved in his diagnoses of individuals' health conditions. Neither he nor his followers ever claimed that he could heal people paranormally; rather, cures were supposedly the result of the treatments prescribed by Cayce during his readings. Cayce's treatments and medications were typical of those prescribed by osteopaths, homeopaths, and sometimes, chiropractors. For the first nine years of Cayce's career, there was someone in attendance at every one of Cayce's readings who knew medical, or at least fringe medical, terminology. Throughout the rest of his career, there were various people with medical knowledge supervising his trances. Though it is true that Cayce was not formally trained in any of these professions, he had ample help mastering the jargon.

For the first year that Cayce gave readings, 1902 to 1903, his trances were supervised by Al Layne, an osteopath with a mail-order degree who also practiced hypnotism. In 1903 Layne was "asked" by the medical association in Hopkinsville, Kentucky, where he and Cayce then lived, to cease his osteopathy practice. Layne then moved to Franklin, Kentucky, to begin studies at the Southern School of Osteopathy. Because of the distance, Cayce and Layne gradually lost touch.

Layne's role as director of Cayce's trances was taken over for three years by a medical doctor, John Blackburn. However, their close relationship soured in 1906 after Blackburn persuaded Cayce to give a public reading at the Bowling Green E.Q.B. Literary Club. This event was attended by several doctors and ended up being the closest thing to a controlled experiment ever performed on Cayce. When Cayce went into his trance, the doctors tested Cayce's responsiveness to external stimuli. One poked him with a hatpin while another cut his left forefinger with a penknife. Cayce "woke up" and cited this occasion for the remaining 39 years of his life as his reason for never allowing himself to be tested under controlled conditions by medical doctors or scientists. There is actually some merit in Cayce's anger: The doctors would have done better by concentrating on the veracity of Cayce's diagnoses and treatments, rather than determining whether he was in a trance or merely faking it. After Blackburn, Cayce found a homeopath, Wesley Ketchum, who arranged a three-way partnership between himself, Cayce, and the owner of a hotel in Hopkinsville, Albert Noe. This partnership lasted until 1911, when Cayce walked out over a dispute with Ketchum over Ketchum's acceptance of a fee for a reading that Cayce had not yet given.

**Edgar Cayce (1877-1945)**

The evidence for Cayce's abilities is thought by many to be impressive simply because of its sheer volume. The foundation set up to study and disseminate Cayce's work, the Association for Research and Enlightenment (A.R.E.), in Virginia Beach, Virginia, boasts 30,000 transcripts of readings recorded by a stenographer at the time the readings were made. These make up almost all the readings Cayce gave in his long career. However, they generally are records only of Cayce's words; not the context of the trance. Thus, these documents are worthless by themselves. First, they do not record what information Cayce could discern in those readings by simple observation of the subject who was present or what Cayce was told by those conducting the session. Much information was available from his followers' letters appealing for help or from other sources. (Sometimes though, the questions posed to Cayce reveal how he could make use of information given to him in the way of a cold reading.) Second, the transcripts tell only what Cayce said, with no indication of what he said as being *true*. For that analysis we would need independent documents reporting on

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the illnesses, treatments, and outcomes, against which we could verify Cayce's claims. The A.R.E. does have some follow-up letters from "patients" and even fewer letters from medical practitioners (either from the fringe or the orthodox varieties) that could fulfill this purpose. However, the A.R.E. has never claimed to have finished its cataloguing of these documents, so we do not know how many of the readings have supporting documents. The examples made available by the A.R.E. consist of testimonials and bread-and-butter letters thanking Cayce for his efforts. These amount to anecdotes that are now unverifiable. As evidence of Cayce's ability to cure, they are also inherently unreliable for the following reasons:

1. Believers in Cayce's work did not insist on a test of either his diagnostic abilities or his cures carried out by someone blind to what Cayce diagnosed or predicted. Thus, reports from the "patient's" own health practitioner, M.D. or otherwise, which purport to confirm Cayce's findings, do so in the same way that copies of the same newspaper from the same pressrun corroborate each other. In both these cases, the trouble is that the "corroborating" evidence is not independent of what it is taken to confirm.

2. No study with a control group was ever done to test whether Cayce's prescribed remedies contributed to the reported improvements in his "patients'" conditions. All we have are anecdotes of individuals recovering after going through the regimens recommended by Cayce. We have no reason to believe that the patient would not have recovered just as well had he or she never heard of Cayce.

3. For the most part we must rely upon "patients'" memories at the onset of their condition, what Cayce or other fringe medical people said of it, what doctors said of it, and what other treatments his "patients" were taking at the time. For many cases, records were not kept at the time of treatment. By the time a "patient" wrote to thank Cayce for helping, years could have elapsed since the symptoms started, and months since some of the symptoms abated. What the patients were doing, what other practitioners did, or even what Cayce advised could very well have been misremembered if documented at a later time. Modern studies show that people's memories of the details surrounding even major events can be very inaccurate.

4. Many "patients" had a strong need to believe in Cayce. Poor people who could not afford orthodox medical care turned to Cayce as their last resort. Seriously ill people who were told by orthodox doctors that they could be offered nothing more than comfort were in the same position. Where would these people be if Cayce was of no use? Parents often have a stronger will to believe in cures when their children are ill than when it is themselves. This powerful need to see positive results even where there are none produces *subjective validation*—the finding of needed results even when they are not there.

5. Even where the A.R.E. has on file a letter reporting confirmation of a Cayce diagnosis or a "patient's" recovery described by a Dr. X, we must be very cautious. Many chiropractors, naturopaths, homeopaths, and others can legitimately preface their names with the title "Doctor," and the poor, rural, small-town southerners who made up the bulk of Cayce's clientele used these kinds of practitioners more often than most people. Even when a Cayce "patient" also had a doctor who was an orthodox M.D., orthodoxy in those days—at the turn of the century and into the forties—was less sophisticated than it is today. When Cayce began his career in 1902, there were many medical doctors practicing who had been taught homeopathy as part of their educational programs. A. Flexner (1910) deplored the quality of both teaching and subject matter in the majority of the 155 medical schools operating in the United States and Canada. His influential document did much to clean up North American medical schools, but it did not do so overnight, and when Cayce stopped giving readings in 1944 there would have been M.D.s still practicing who graduated from schools in which Cayce may as well have been teaching. Even when doctors knew the status of a patient's health, standards of informing patients were much different than they are now. It was common for a doctor not to inform a patient that he or she was getting worse or dying, on the grounds that the patient's recovery would be slowed by bad news, or that his or her last days would be made more miserable than need be. Thus, there are probably letters on file at A.R.E. from Cayce's grateful "patients" whose last pleasant task before expiring was to thank Cayce for curing them and to honestly report that their M.D.s *said* that they were doing much better. In fact, Randi (1987) reports that Cayce gave written readings of the healthful futures for "patients" who were dead by the time their letters reached him.

Taken at face value, the A.R.E. records are not as impressive as many believe. Cayce and Cayce (1971), sons of Edgar Cayce, present an analysis of 150 Edgar Cayce cases, according to them, chosen at random. They examined the original request for treatment, Cayce's reading, and the "patients'" or relatives' subsequent letters reporting on the results. The A.R.E. reports its data as evidence of Cayce's incredibly high success rate. However, Randi (1987) analyzed the same data to reach a different conclusion. Of the 150 cases, 65 reported positive outcomes, and 11 were, in Randi's words, "negative" outcomes but were, in the words of Cayce and Cayce, "considered inadequate." But 74 sent no report at all, and so were simply eliminated from Cayce and Cayce's analysis. Thus, they report 65 out of 76 successes, or almost 86 percent. But Randi notes that since people who write or show up for a reading must already be disposed to believe in Cayce, we can expect that these people are disposed to report anything positive that they might believe. Thus, the fact that half of Cayce's "patients" did not write back is an indication that possibly they had nothing positive to say or were dead; and to simply discard them, as the Cayces did, is to inflate the success rate. Cayce and Cayce report that 46 of the 150 "patients" were physically present for the readings, thus giving Cayce, or his fringe medical trance director, the opportunity to observe valuable cues that would help produce a positive reading. Of the 104 who were not present for the readings, Cayce and

Cayce report that 35 did not give any information about their condition. We do not know what percentage of these gave no report (suggesting that Cayce's reading of them was not helpful). But, as Randi points out, this leaves 69 who did provide information, and it now becomes less surprising that Cayce could produce a reading that provided them with some satisfaction.

Evidence of subjective validation can be found throughout Edgar Cayce's readings. "Patients," and their friends and relatives, could always find events or symptoms to match Cayce's convoluted pronouncements. Such subjective validation is present in the first reading Cayce gave for anyone, other than himself or Layne, in 1902. This was given for the retired Hopkinsville Superintendent of Schools, C. H. Dietrich. His 5-year-old daughter, Aime, had been suffering from seizures for three years prior to getting a reading from Cayce. Sugrue (1945) reports that she had been seen by "specialists" in the past, but does not report what their specialties were or whether Aime was seeing a medical doctor at the time. He does report that, earlier, doctors had diagnosed her condition as "nervousness," while a Cincinnati doctor diagnosed her as having a "rare brain infection" and gave death as the prognosis. In any event, Cayce's reading stated that the girl had struck the end of her spine while getting out of a carriage three years before, and, the next day, came down with the grippe. Her medical troubles started from there. After Cayce stated this, the girl's mother "remembered" the event, but said she did not note it at the time because the little girl did not appear to be injured and ran around as usual after the accident. For the mother, the evidence of Cayce's extraordinarily prescience to "know" that this happened was in Cayce's colleague Layne confirming the injury. After a couple of Layne's osteopathic treatments, the child's symptoms were gone; and the Dietrichs became strong proponents of Cayce, sending several prominent and useful patients Cayce's way. But there is no evidence of follow-up by medical doctors in this case—a constant theme in Cayce's treatments throughout his career.

Cayce's followers never suggested an explanation for the development of his clairvoyant powers. However, his family's account of the onset is as follows. At the age of 13, an angel appeared to young Edgar Cayce in a secluded spot in the woods and asked Cayce what he wanted most. He responded that he wanted to help others, at which point the angel vanished. He was so disturbed that night that he slept poorly; consequently, the next day his performance at school was worse than usual. He was always thought to be dull in school, but this day was so much worse that Cayce's father, Leslie, was determined that evening to see him learn his spelling lessons. After an evening of futile spelling drill, at 11 P.M. Leslie suggested that they give up for the night and go to bed. Edgar asked to be allowed to take a five-minute nap and insisted that after sleeping he would know the lesson. Leslie went to the kitchen for a drink of water, and on his return Edgar was fast asleep with his head resting on his textbook. Leslie woke him up and told him to go to bed. At this point Edgar knew everything that was in the book. For the rest of his life Cayce used this method to learn from books and supposedly had near perfect retention of material gathered this way. However, Cayce never displayed this skill publicly, nor submitted himself to any controlled tests of these claims.

For two years the clairvoyance was useful only to help Cayce pass his spelling tests. Then, in 1892, when he was 15, he was hit in the neck with a baseball in the schoolyard. After behaving strangely for the rest of the day, laughing and throwing things, he went to bed. He then demanded a poultice made of corn meal, onions, and herbs—typical of the treatments recommended in the almanacs of the day from which most farm families treated themselves. He then settled down and was fine the next day except for claiming to remember nothing from the time he was hit with the ball until he awoke the next morning. Sugrue (1945) offers this story as evidence of Cayce's first clairvoyant diagnosis and prescription. The only other aspect of Cayce's teenage life of any interest was his claim to have dowsed for water on a few occasions, a talent he claimed to have inherited from his grandfather.

**"In 1926, [Cayce] prescribed for a New York patient the raw side of a freshly skinned rabbit, still warm with blood, fur side out, placed on the breast for cancer of that area."**

In 1900 Cayce had a bout of laryngitis that resulted in a loss of his voice for ten months—likely hysterical in origin. He had just started a job as a traveling salesman, taking him on the road away from his fiancée Gertrude Evans, in Hopkinsville. It was only reasonable for him to quit this job and return to Hopkinsville and Gertrude. He began an apprenticeship with a local photographer. When Hart the Laugh King, a stage hypnotist, passed through town, Cayce's family asked the hypnotist to give Cayce a private consultation. He proved to be a good subject and regained his voice while "hypnotized." But when he awoke, the "post-hypnotic suggestion" did not take, and he was still speechless. In 1901 Cayce tried the town's only resident hypnotist, Al Layne, who was also the bookkeeper for his wife's millinery shop and had just completed his mail-order course in osteopathy. When Layne "hypnotized" him, Cayce took control of the situation and began a reading on himself, starting with the line that was to introduce his readings for others for the next 43 years: "Yes, we can see the body." When Cayce awoke, his voice was permanently restored. Layne was so impressed that he asked Cayce to return the favor and do a reading on him. Layne had suffered from stomach trouble for years. Cayce obliged the next day, and Layne was so impressed with Cayce's diagnosis of him and the remedies suggested that he proposed that they go into partnership—Cayce to provide the diagnosis and Layne the interpretation of Cayce's suggested remedies. Thus

began the year-long partnership mentioned earlier, though Cayce decided to move to nearby Bowling Green to take a job in a bookstore. Sugrue (1945) reports that Cayce continued to have doubts about whether God approved of him using his powers to cure people this way, and maintains that this was the explanation for Cayce alternating over the next few years between his careers as a photographer and as a healer. Another possibility is that there was not enough money in readings alone to make ends meet for his growing family.

Cayce was a devout Christian, vowing when he was 10 years old to read the Bible once for each year of his life. By the time he was 12 years old he claimed to have read it 12 times, despite the evidence of his family that he was dull and an impossible speller at this age, until his psychic ability developed. He continued thereafter to read the book annually until his death. His psychic readings for the first 21 years were full of biblical phrases and metaphors, with no hint of anything outside the views of the Christian Church, an offshoot of Presbyterianism in the southern United States. In 1923, after the collapse of his Texas oil well venture (he predicted oil, but none materialized), Cayce gave a reading for Arthur Lammers, a wealthy Dayton printer who was a believer in Nostradamus, reincarnation, astrology, and other occult notions. Cayce's readings confirmed Lammers's beliefs, and from that time on Cayce's readings referred to these notions, as well as Atlantis, and what he and Lammers took to be gnostic beliefs. Cayce attempted to reconcile these notions with Christianity by adopting claims of British Israelism. This is a group that claims the British are descendants of a lost tribe of Israel who worked on the Egyptian pyramids, where they picked up much occult knowledge that was later forgotten by mainstream Christianity.

**"*The New York Times Magazine* published . . . the headline 'Illiterate Man Becomes a Doctor When Hypnotized: Strange Power Shown by Edgar Cayce Puzzles Physicians.'"**

There is a myth surrounding Cayce that he was illiterate, uneducated, and incapable of learning through normal channels about the cures he prescribed for individuals during his "trance" states. The source of this myth was an article in *The New York Times Magazine* published Sunday, October 9, 1910, with the headline "Illiterate Man Becomes a Doctor When Hypnotized: Strange Power Shown by Edgar Cayce Puzzles Physicians." The notion that he had no knowledge of medical facts during his awake states is not only incompatible with the family's belief that he obtained knowledge by literally "sleeping on it" and then had perfect retention of those facts while in the awake state, it is also incompatible with other facts of Cayce's life. Cayce attended school until 16 and worked in several bookstores before becoming a photographer. His first job in a bookstore was in one that supplied the books for two high schools, a girl's college, and South Kentucky College. Many of the texts for the colleges that passed through his hands contained information that would appear in his readings. His diagnoses and remedies were common to almanacs and home remedy books that were in every farmhouse in the southern United States at the time, and therefore, readily available to Cayce in the various bookstores he worked in, if not in his own home. And as previously mentioned, throughout his career his trances were managed by M.D.s, homeopaths, and osteopaths. He also discussed cases with chiropractors.

Much is made of Cayce restoring the sight of his son Hugh Lynn Cayce in 1914, after the 8-year-old boy had accidentally ignited some photographic flash powder in his father's studio. Hugh Lynn was in the care of orthodox medicine for this injury, but Sugrue (1945) reports that the physicians had given up hope that the child would recover his sight. Cayce's "reading" for his son called for tannic acid to be applied to the injury, and against the doctors' advice, this was done. The implication was that it was Cayce's prescription from his "reading" that restored the child's sight. Also, Sugrue maintains that Cayce was the one responsible for his wife Gertrude's recovery from tuberculosis, rather than the doctors who also treated her. However, this is questionable: Sugrue did not even meet Cayce until 14 years after these two recoveries; there was no independent corroboration from the doctors concerned; and 16 more years elapsed until the first edition of Sugrue's book—more than enough time for these stories to grow with the retelling.

Failures to cure relatives are given scant attention by Cayce historians. Sugrue (1945), for example, passes over the incident of a relative's finger being crushed in Cayce's presence, the death of Cayce's cousin Ike who appealed to him for help in 1910, and Cayce's second son, Milton Porter Cayce, who died in 1911. In the latter case, Sugrue even notes that despite the newborn having developed whooping cough, then colitis, Cayce never even thought the illness was serious enough to do a reading for him until just after the doctors gave up and just before the child died.

Cayce always dreamed of setting up a hospital and center of learning. When he finally received some financial backing in 1927 from New York stockbroker Morton Blumenthal, the "readings" told him that such a complex should be located in Virginia Beach, Virginia. Cayce was most interested in a hospital that would guarantee that the treatments he prescribed would be carried out. Blumenthal shared this vision, but also wanted a place of learning to pursue his own metaphysical quests. The hospital opened in late 1928; and the institute of learning, Atlantic University, opened in September 1930.

In the beginning, the hospital was under the nominal direction of T. B. House, Cayce's wife's brother-in-law, who held both an M.D. degree and a D.O. degree (doctor of osteopathy). However, House was very ill and died in late 1929. The next director was Lyman A. Lydic, an osteopath. No M.D. wished to be associated with the hospital; so House's

departure ended any hope that the hospital would be a place to integrate the best of then considered "fringe" medical practices—such as chiropractic, naturopathy, and osteopathy—with Cayce's techniques and with scientific medicine. [Osteopathy in the United States in the late eighteenth and early nineteenth centuries was widely considered a "fringe" medicine. Today, doctors of osteopathy (D.O.) meet the same educational and licensing standards as doctors of medicine (M.D.). M.D.s practice allopathic (organ-based) medicine; O.D.s also utilize allopathic treatment, but primarily approach pathology holistically by physically manipulating the spine to affect body systems. Its founder, Andrew Taylor Still, went to his death in 1917 denying the germ theory of disease. It was not until 1929 that its professional body formally renounced the bulk of Still's teachings, though most practitioners had quietly done so long before—some even before Still's death. For more on this, see Armstrong and Metzger (1991).] The treatments in Cayce's hospital consisted of those considered "fringe" even by 1930s standards: hydrotherapy, colonic irrigation, radioactive treatments, and electrical treatments. What made the place unique were Cayce's "readings" as a means of diagnosis. Cayce found several patients to be suffering from conditions left over from previous lives. Cayce's treatments were usually those commonly prescribed in those days by fringe medicine practitioners. At various times in his career Cayce recommended Jerusalem artichokes as a natural source of insulin; smoking as being beneficial in moderation; turpentine; heroin in liquid form; belladonna; and kerosene. At least he recommended that the kerosene be applied externally.

By February 28, 1931, the hospital was forced to close and the university would have to make it without financial help from Blumenthal, who was by this time in the same financial difficulties as were those who had to deal with the Great Depression without Cayce's advice. The university closed shortly thereafter. The Association for Research and Enlightenment rose phoenixlike from the ashes of the university, though it was run out of Cayce's house until 1940, when the house expanded to include a wing for the A.R.E. The institution's headquarters is still located in Virginia Beach.

Cayce was one of the earliest promoters of laetrile as a cure for cancer. Laetrile is not only without curative powers, it contains cyanide. Stern (1967) summarizes Cayce's pronouncements on cancer. He reports that Cayce prescribed a serum made from the blood of rabbits for patients with "glandular," breast, and thyroid cancers; and in 1926, prescribed for a New York patient the raw side of a freshly skinned rabbit, still warm with blood, fur side out, placed on the breast for cancer of that area. "Animated ash," produced by taking bamboo fibers and passing an electrical charge through them, thereby producing the right vibrations for "life flowing effects," was another of his favorite cures. On the matter of electromagnetic vibrations, Cayce's theory was inconsistent with modern fears that low-frequency electromagnetic vibrations can be carcinogenic. Cayce thought they could enhance life. On the other hand, one of Cayce's theories of the cause of cancer has survived in modern cancer fears. Those who fear "man-made toxins" as being carcinogenic can trace these fears back to Cayce, who worried that "toxics" would overload the system with "used tissue," which is tissue that has used up its natural allotment of vitality. This tissue must be eliminated, but it tends to accumulate around bruises, which is why, he thought, these are likely places for cancer to start. He also thought that ultraviolet light shone through green glass would be more effective than X rays, since green is the "healing vibration."

Cayce made several predictions about future scientific discoveries. Stern (1967) reports that in 1933 Cayce predicted that a "death ray" perfected on Atlantis would be rediscovered in the United States by 1958. Atlantis played a central role in Cayce's geophysics. He taught that Atlantis was the size of Europe plus some of Asia, and was to be found in an area bounded by the Sargasso Sea and the Azores. About 15600 B.C. two major disasters occurred, the result of human error, he said. Power on Atlantis was produced by "firestone," directly from the sun, at stations spread over the islands. One day a careless Atlantean cranked the power up to high, reducing the continent to a string of islands. Due to moral decay and other problems, the last three disappeared about 10000 B.C., sending the survivors searching for a home. They ended up all over the world, from the Basque country to Mexico, bringing some of their technology with them—though, fortunately, not the "firestone."

Cayce thought that cataclysms were not confined to Atlantean times. Many New Agers are waiting for the devastating earthquake he predicted for California at some unspecified date that will cause it to slide into the sea. However, it is less well known that Cayce made the same open-ended prediction for Japan, and, more astonishingly, New York City.

Always wanting to be helpful, he offered a stream of information to Charles Lindbergh in 1932 with the hope that it would help in recovering his kidnapped baby. As Randi (1987) reports, most of it was wrong, and all of it was useless. Randi recounts and analyzes the excuses offered by Cayce and Cayce (1971) for Edgar Cayce's misinformation. Cayce's economic and geopolitical predictions, where precise enough to be verified or falsified, fared no better. As Stern (1967) reports, in 1931 Cayce predicted, "In the spring of '33 will be the real definite improvements" in the Great Depression; and in 1943 he predicted that China would be "mostly Christian" by 1968.

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# Psychic Crime Detectives:
## A New Test for Measuring Their Successes and Failures

*A controlled test of 'psychic detectives,' using a novel method, found that they were no more accurate than college students. Yet the psychics all thought they had been successful.*

RICHARD WISEMAN, DONALD WEST, AND ROY STEMMAN

Many psychics claim to be able to help the police solve serious crime. Recent surveys suggest that approximately 35 percent of urban United States police departments and 19 percent of rural departments (Sweat and Durm 1993) admit to having used a psychic at least once in their investigations. In addition, Lyons and Truzzi (1991) report the widespread use of psychic detectives in several other countries including Britain, Holland, Germany, and France.

Most of these psychics' claims are supported only by anecdotal evidence. This is unfortunate because it is often extremely difficult to rule out nonpsychic explanations. For example, Hoebens (1985) described how some psychics have made several (often conflicting) predictions relating to an

unsolved crime. Once the crime was solved, the incorrect predictions were forgotten while the correct ones were exhibited as evidence of paranormal ability. Rowe (1993) cites examples of psychics making vague and ambiguous predictions that later were interpreted to fit the facts of the crime. Lyons and Truzzi (1991) noted that it is often difficult to obtain "baseline" information for many of these predictions. For example, a psychic may state that a murder weapon will be discovered "near, or in, a large body of water." Although this may later prove to be accurate, it is difficult to know how many criminals dump incriminating objects in areas that could be seen as "large bodies of water" (e.g., streams, lakes, rivers, the ocean, etc.) and therefore establish a statistical baseline for the prediction.

Some investigators have overcome these problems by carrying out controlled tests of psychic detection abilities. One of the earliest controlled studies was conducted by a Dutch police officer, Filippus Brink. Brink carried out a one-year study using four psychics. These psychics were shown various photographs and objects and asked to describe the crimes that had taken place. Some of the photographs and objects were connected with actual crimes; others were not. In a report to INTERPOL, Brink (1960) noted that the psychics had failed to provide any information that would have been of any use to an investigating officer. However, this report is brief and, as noted by Lyons and Truzzi (1991, p. 51): "Because Brink gives us few details of his method and analysis in this report, the strength, if not the value, of his conclusions cannot really be evaluated."

Studies have been carried out by Martin Reiser of the Los Angeles Police Department. An initial study by Reiser, Ludwig, Saxe, and Wagner (1979) involved twelve psychics. Each psychic was presented with several sealed envelopes containing physical evidence from four crimes (two solved, two unsolved). The psychics were asked to describe the crimes that had taken place. They were then allowed to open the envelopes and describe any additional impressions they received from the object. The study was double-blind, as neither the psychics nor the experimenters had any prior knowledge of the details of the crimes.

The psychics' statements were then coded into several categories (e.g., crime committed, victim, suspect, etc.) and compared with the information known about the crime. For each of the psychics' predictions that matched the actual information, they were awarded one point. The psychics' performances were less than impressive. For example, the experimenters knew that 21 key facts were true of the first crime. The psychics identified an average of only 4. Similarly, of the 33 known facts concerning the second crime, the psychics correctly identified an average of only 1.8. This data caused Reiser et al. to conclude: "The research data does not support the contention that psychics can provide significant additional information leading to the solution of major crime" (pp. 21-22).

| | Individual scores (min=0, max=6) | Group scores (min=0, max=6) | Z-score | P-value (2 tailed) |
|---|---|---|---|---|
| **Psychic 1** | 2.3 (1.15) | 2.09 (0.68) | .24 | .8 |
| **Psychic 2** | 2.66 (0.57) | | .73 | .46 |
| **Psychic 3** | 1.33 (0.57) | | -.73 | .46 |
| **Student 1** | 2 (0.5) | 2.33 (0.57) | 0 | 1 |
| **Student 2** | 2 (0.5) | | 0 | 1 |
| **Student 3** | 3 (1.73) | | 1.21 | .22 |

**Table 1:** Individual/group means, standard deviations (in brackets), z-scores, and p-values.

Reiser and Klyver (1982) also carried out a follow-up study that used three groups of participants: psychic detectives, students, and police homicide detectives. Four crimes were used (two solved and two unsolved) and again physical evidence from each crime was presented to participants in sealed envelopes. Reiser and Klyver report that the data produced by the three groups was quite different in quantity and character. The psychic detectives produced descriptions that were, on average, six times the length of the student descriptions. In addition, the psychic detectives' statements sounded more confident and dramatic than those produced by either the students or the homicide detectives. Parts of the descriptions were separated into several categories (e.g., sex of criminal, age, height, etc.) and, if correct, assigned one point. A comparison between the three groups showed that although the psychics produced the greatest number of predictions, they were not any more accurate than either the students or the homicide detectives.

In August 1994 the authors of this article were contacted by a British television company involved in making a major documentary series on the paranormal (Arthur C. Clarke's "Mysterious Universe"). One of their programs was to be devoted to psychic detectives, and the producers were eager to film a well-controlled test of three British psychics. The company approached the authors and asked if we would design and carry out these tests. We agreed.

This was the first test of its type in Britain and one of only a handful carried out anywhere in the world. In addition, the methods used during previous studies have been the subject of some criticism (see Lyons and Truzzi 1991) so the authors thought it worthwhile to devise a new method for testing the claims of psychic detection.

This test compared the performance of two groups of participants: psychic detectives and a "control" group of college students. Two of the psychics were professional while the third (who will be referred to as "Psychic 1") was not, but had recently received a great deal of attention from the British media. The psychic's local police force (Hertfordshire Police Force) described him as follows:

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| | Accuracy rating (min=0, max=7) | Number of statements | Group scores (min=0, max=7) |
|---|---|---|---|
| **Psychic 1** | 3.87 (2.57) | 15 | 3.83 (0.17) |
| **Psychic 2** | 3.65 (1.83) | 16 | |
| **Psychic 3** | 4.00 (1.96) | 8 | |
| **Student 1** | 6.37 (0.64) | 8 | 5.63 (1.28) |
| **Student 2** | 4.14 (2.62) | 7 | |
| **Student 3** | 5.10 (2.13) | 5 | |

**Table 2:** Individual/group accuracy means, standard deviations (in brackets), and number of statements.

> When [psychic's name] comes to the police with his dreams, he is taken seriously and the information that he passes on to his established contact, Sgt. Richard MacGregor, is acted upon immediately (*Psychic News*, November 26, 1994, p. 1)[1]

None of the students claimed to be psychic or had any special interest in criminology.

Each participant was shown three items that had been involved in one of three crimes: a bullet, a scarf, and a shoe. They were asked to handle each of the objects and speak aloud any ideas, images, or thoughts that might be related to these crimes. Participants were told that they were free to take as long as they wished and to say as little or as much as they thought necessary. During the test they were left alone in the room, but everything they said and did was filmed.

After they had finished commenting on all three objects, the participants were given three response sheets (one for each object), each containing 18 statements. Six of each of the 18 statements were true of each crime. The participants were then asked to mark the 6 statements that they believed were true about the crime in question.

Table 1 presents the individual scores for each of the six participants. None of the scores of any of the individuals was statistically significant or impressive.

It could be argued that the above method of testing might *underestimate* participants' psychic ability. For example, a participant may have made several accurate comments describing the crime in question but, nevertheless, obtained a low score if this information was not included on the list of 18 statements. For this reason, a judge not involved in the test transcribed and separated all of the comments made by the participants as the participants handled the objects. The order of these statements was then randomized within each crime and presented to two additional judges. These judges were asked to read about each crime and rate the accuracy of each statement from 1 (very inaccurate) to 7 (very accurate). Table 2 contains the average of the two judges' ratings (inter-rater reliability = .77).

Overall, the psychics made a total of 39 statements while the students made 20 statements. A paired t-test showed no significant differences for the accuracy ratings of students and psychics ($t = 2.38$, $df = 4$, $p[2\ tailed] = .074$). This supports Reiser and Klyver's finding that even though psychics tend to make more predictions than students, they are no more accurate.

After their predictions had been recorded, the participants were told about the crimes associated with each of the target objects. This debriefing was filmed, and it is interesting to review the way in which the participants reacted to finding out the truth about each crime:

**Crime 1. The Moat Farm murder, 1889-1903.** In 1889 an army sergeant major named Samuel Herbert Dougal wished to have an affair with his maid but first needed to dispose of his wife. On May 16, 1889, he and his wife went out for a horse-and-trap ride into the town. During the trip Dougal shot his wife in the head and buried her in a ditch. The body remained buried for four years before the police eventually discovered it. The shoes worn by the corpse were identified by a cobbler as belonging to the dead woman, and Dougal was hung for the murder in 1903.

**Crime 2. The murder of Constable Gutteride, 1927.** In 1927 a police officer (Constable George William Gutteridge from the Essex Police Force) stopped a stolen car. The driver suddenly pulled out a gun and fired two shots—one into each of Constable Gutteridge's eyes. The car was later found abandoned in Brixton, London. A six-month-long investigation resulted in two men having been caught and hanged. An important part of the incriminating evidence was the bullet removed from the scene of the crime.

**Crime 3. The killing of Margery Pattison, 1962.** Margery Pattison, a 71-year-old widow, returned to her flat and disturbed her milkman who had entered through an unlocked door and had started to look for money. An argument ensued and the man grabbed the scarf around her neck, pulled it tight, and strangled her. The man was later caught and charged with murder.

All three psychics thought that they had been successful. On hearing that Crime 2 involved the killing of a police officer, Psychic 1 noted that one of his precognitive dreams involved Police Constable Keith Blakelock (who had been killed on duty in London a few years earlier). This participant noted that he thought at the time the dream was related to Blakelock's murder, but that he now believed it related to the killing of Constable Gutteridge. The same participant remarked that he felt he had given a successful description of Crime 1, as he had said it involved a woman having been raped and murdered and that "that is the fundamental theme of the crime." Psychic 1 failed to recall that he had also said the woman was murdered by a black man and that it happened on Tottenham Court Road. Both of these statements were incorrect. This lends support to the notion that some psychic detection may appear to work, in part, because inaccurate predictions may be forgotten about later, whereas successful ones are recalled and elaborated on.

Psychic 2 remarked that he believed that the experiment showed a "good conclusion all round" and that "my colleagues and I have put the jigsaw puzzle together." He emphasized

*Psychics continued on page 58*

# Health Statistics May Be Bad for Our Mental Health

*Psychological, mathematical, and factual lapses underlie many of our inappropriate reactions to statistics. News reports often help foster these responses.*

JOHN ALLEN PAULOS

Health statistics may be bad for our mental health. Inundated by too many of them, we tend to ignore them completely, to react to them emotionally, to accept them blithely, to disbelieve them closed-mindedly, or simply to misinterpret their significance. (The National Institute of Unchallengeable Statistics reports that 88.479 percent of us have one of these five reactions 5.613 times per day, leading to the 8,373,429 cases of "dyscalculia"—a fear of or inability to use numbers appropriately—recorded annually.) Since the injunction to show and not tell extends beyond classes on creative writing, I'll focus here on specific examples that illustrate successively the psychological, mathematical, and factual lapses that underlie many of our inappropriate reactions to statistics and on the ways in which newspapers foster these responses.

First, the psychological component of dyscalculia. In dis-

Brad Marshall

cussions [in *A Mathematician Reads the Newspaper*] on cellular phones, military death tolls, and other topics, I demonstrated the impact of the "availability error" on mathematical common sense. Anxiety, fear, and the force of a vivid anecdote can, for example, mask the mathematical distinction between the rate of incidence of some condition and the absolute number of its instances. In a country the size of the United States, an extremely rare condition that distresses, say, one in a million people will still afflict 260 people. The bias termed "anchoring effects," also discussed in my book, plays a role in the perception of health risks as well: People generally remain anchored to the first number they hear, whether accurate or not.

Even round numbers have a psychological appeal for us—specifically, multiples of ten. It's been maintained for years, for example, that 10 percent of Americans are homosexual, that we each use only about 10 percent of our brain capacity, and that the condom failure rate is 10 percent. Such statistics are artifacts, I presume, of our decimal system; in a base 12 system, we'd no doubt have many 8 1/3 percent statistics. These numbers, although few of us understand precisely what they mean, once accepted, become resistant to significant revision.

When health risks involve large numbers and fall outside our daily frame of reference or beyond our personal control, we're more likely to be swayed by psychological factors and misjudge the real hazard. For example, drugs are an undeniable scourge, but the biggest killers among them are tobacco (400,000 annually) and alcohol (90,000 annually), not cocaine (8,000) or heroin (6,000), which nevertheless have more emotional impact and induce more alarm. As the physicist H. W. Lewis has written, nuclear power plants are feared by most Americans, yet the prosaic problem of lead in old paint and old pipes has caused far more harm. Likewise, the famed California biochemist Bruce Ames has estimated that we ingest 10,000 times as much natural as man-made pesticides: the estragol in basil, the hydrazines in mushrooms, the aflatoxins in peanuts, and so on. But no one rides around with a bumper sticker reading *No Peanuts*. People worry that electromagnetic fields, which have increased by a factor of ten in the last fifty years, have caused an increase in leukemia rates, which in fact have risen slightly, if at all, in that time.

Such unfounded, or at least excessive, private concerns are not without public consequences. They have led, for example, to passage of such benighted legislation as the Delaney Clause of the FDA Act of 1958, which requires that "no food additive

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shall be deemed safe if it is found . . . to induce cancer in man or animal." Since its adoption, the law's scope has been widened to include pesticides and other pollutants—but no minimum allowed level has ever been specified. And in the subsequent expensive, time-consuming, and impossible effort to reduce minuscule risks to zero, little money or energy is left for substantial, albeit more banal, hazards.

Next, there are the statistical niceties, more to the mathematical side of the psychology-mathematics continuum. Consider Simpson's Paradox, which involves not the media's coverage of the O. J. spectacle but a particular, easily made arithmetical error: concluding that if you average several sets of numbers (or percentages) and then average these averages, the resulting number will be the average of all the numbers. Thus, if a study indicates that 36 percent of ethnic group A and 45 percent of ethnic group B improve from some treatment, and a second study indicates that 60 percent of group A and 65 percent of group B improve, it is tempting but incorrect to conclude that a higher percentage of group B improves. The first study might, for example, have included 100 members of group A and 1,000 members of group B, while in the second study these numbers might have been reversed. If so, how many of the 1,100 members of each ethnic group improved?*

**False Positives**

| | Sick | Healthy | |
|---|---|---|---|
| Test Positive | 99 | 999 | 1,098 |
| Test Negative | 1 | 98,901 | 98,902 |
| | 100 | 99,900 | 100,000 |

Conditional probability that one has D given one's tested positive is $\frac{99}{1,098}$, or a bit over 9%—this for a test that was assumed to be 99% accurate.

Now consider the following different but related scenario, which suggests how a headline such as HALF OF SUFFERERS ARE LONG TERM might come about. Mr. X has suffered from a certain disease for years. In January, X and A are both treated for this disease. In February, A finds himself cured, but B contracts the disease. In March, B is better, but C reports for treatment, and so on. Poor Mr. X continues to suffer throughout the year. If one examines the record for any given month, however, one finds that 50 percent of the ailing people (always X and one other person) are chronic sufferers. Yet only 1/13 of the people who suffer from this disease in any given year suffer from it for long.

An understanding of the mathematical notion of "conditional probability" is crucial to the proper interpreting of statistics.The probability of someone speaking English, given that (or on the condition that) he or she is an American citizen, is, let's assume, 95 percent. The conditional probability that someone is an American, given that he or she speaks English, is much less—say, 20 percent.

For a compelling application of conditional probability, consider this instance of Bayes's theorem. You've taken a test for dread disease D (perhaps even dyscalculia), and your doctor has solemnly advised you that you've tested positive. How despondent should you be?

To see that cautious optimism may be appropriate, suppose there is a test for disease D that is 99 percent accurate in the following sense. If you have D, the test will be positive 99 percent of the time, and if you don't have it, the test will be negative 99 percent of the time. (For simplicity, I'm using the *same percentage for both positive and negative tests.) Suppose* further that .1 percent—one out of every thousand people—actually has this rare disease.

Let's now assume that 100,000 tests for D are administered (see diagram). Of these, how many will be positive? On the average, 100 of these 100,000 people (.1 percent of 100,000) will have D, and so, since 99 percent of these 100 will test positive, we will have, on average, 99 positive tests. Of the 99,900 healthy people, 1 percent will test positive, resulting in a total of approximately 999 positive tests (1 percent of 99,900 is 999). Thus, of the total of 1,098 positive tests (999 + 99 = 1,098), most (999) are false positives, and so the conditional probability that you have D given that you tested positive is 99/1,098 or a bit over 9 percent—and this for a test that was assumed to be 99 percent accurate!

**"People worry that electromagnetic fields, which have increased by a factor of ten in the last fifty years, have caused an increase in leukemia rates, which in fact have risen slightly, if at all, in that time."**

To reiterate, the conditional probability that you test positive given that you have D is 99 percent, yet only 9 percent of those with positive tests will have D.

The whole panoply of statistical tests, estimates, and procedures gives rise to many mathematical nuances that may have practical consequences. Determining for example, when clusters of a particular disease constitute evidence of something seriously awry or merely a coincidental clumping is not easy (especially for people who insist on reading significance into everything). And most people still don't realize that what's critical about a random sample is its absolute size, not its per-

*Thirty-six percent of the 100 members of ethnic group A in the first study *and 60 percent of the 1,000 members of A in the second study improved, for* a total of 636 A members. Forty-five percent of the 1,000 members of ethnic group B in the first study and 65 percent of the 100 members of B in the second study improved, for a total of 515 B members.

critical about a random sample is its absolute size, not its percentage of the population. Although it may seem counterintuitive, a random sample of 500 people taken from the entire U.S. population of 260 million is generally far more predictive of its population (has a smaller margin of error) than a random sample of 50 taken from a population of 2,600.

A more elementary widespread confusion is that between correlation and causation. Studies have shown repeatedly, for example, that children with longer arms reason better than those with shorter arms, but there is no causal connection here. Children with longer arms reason better because they're older! Consider a headline that invites us to infer a causal connection: BOTTLED WATER LINKED TO HEALTHIER BABIES. Without further evidence, this invitation should be refused, since affluent parents are more likely both to drink bottled water and to have healthy children; they have the stability and wherewithal to offer good food, clothing, shelter, and amenities. Families that own cappuccino makers are more likely to have healthy babies for the same reason. Making a practice of questioning correlations when reading about "links" between this practice and that condition is good statistical hygiene.

**"Drugs are an undeniable scourge, but the biggest killers among them are tobacco (400,000 annually) and alcohol (90,000 annually), not cocaine (8,000) or heroin (6,000), which nevertheless have more emotional impact and induce more alarm."**

In other cases, the mystery of statistics is not a result of psychological blinders or mathematical esoterica, but of a lack of information about exactly what they mean and how they were obtained. The earlier mentioned 10 percent condom failure rate, originally cited in a Planned Parenthood study, is one example. It appears that it resulted from asking couples what their primary method of birth control was and whether it had ever failed them. Approximately one out of ten condom-using couples answered yes, and a statistic was born, even though there seem to be no other statistics to back up the figure.

If the issue is condom leakage, these rates are exceedingly low. (Based on its own and other investigations, *Consumer Reports* concluded: "In principle, latex condoms can be close to 100 percent effective.") If the concern is contraception, the data depend significantly on age, race, and marital status, categories that are surely independent of condom-failure rates. Likewise, if the question is the prevention of sexually transmitted diseases, the numbers again depend on how carefully the condoms are used, but such figures are, except for voyeurs perhaps, difficult to estimate. There is considerable circumstantial evidence, however: Prostitutes in Nevada whose clients always use condoms, for example, contract almost no sexually transmitted diseases.

Failure to put statistics, even accurate ones, into context makes it almost impossible to evaluate personal risk with a clear eye. For example, we often hear the claim that 1 in 8 women will develop breast cancer. This figure is correct, but it is misleading for several reasons. First, it is a lifetime incidence risk, not a mortality risk, which is 1 in 28. Second, the incidence rate for breast cancer, like that for most cancers, rises with age; the risk of a woman's having developed breast cancer by the age of fifty is 1 in 50, but by the age of eighty-five it is 1 in 9. According to a 1993 report by the National Cancer Institute, the typical forty-year-old woman has about a 1.58 percent chance of developing the disease before she reaches fifty and a 3.91 percent chance of developing it before sixty. The typical twenty-year-old, by contrast, has a 0.04 percent chance of developing the disease before age thirty and a 0.47 percent chance of developing it before forty.

The lifetime risk from breast cancer has risen in the last twenty years, but two factors must be remembered. Increases in screening have led to the early discovery of more cancers, and women are dying less frequently from other causes and hence living to ages where the incidence risk is higher. Interestingly, *any* health practice that correlates positively with longevity will likely correlate positively with cancer incidence as well. This fact brings to mind the true, but potentially deceptive, statistic that heart disease and cancer are the two leading killers of Americans. Of the approximately two million Americans who die each year, for example, almost half die from cardiovascular diseases and about one-fourth from malignancies of various sorts. But accidental deaths—falls, car accidents, drownings, poisonings, fires, gun mishaps, and the like—result in slightly more lost *years* of potential life (subtracted from the conventionally chosen age of sixty-five), according to the Centers for Disease Control. The average age of accident victims is much lower than that of victims of cancer and heart disease. Along this dimension, AIDS and murder loom ominously as well. For all such circumstances, the number of dead is smaller, but the number of years of life lost is greater.

One final note: Implausibly precise statistics, like the ones I fooled with at the beginning of this article, are often bogus. Consider a precise number that is well known to generations of parents and doctors: the normal human body temperature of 98.6° Fahrenheit. Recent investigations involving millions of measurements have revealed that this number is wrong: normal human body temperature is actually 98.2° Fahrenheit. The fault, however, lies not with Dr. Wunderlich's original measurements—they were averaged and sensibly rounded to the nearest degree: 37° Celsius. When this temperature was converted to Fahrenheit, however, the rounding was forgotten, and 98.6 was taken to be accurate to the nearest tenth of a degree. Had the original interval between 36.5° Celsius and 37.5° Celsius been translated, the equivalent Fahrenheit temperatures would have ranged from 97.7° to 99.5°. Apparently, dyscalculia can even cause fevers. □

# Science and Reason in Film and Television

*Recent entertainment media portrayals of science and pseudoscience imply that skepticism is no longer useful and may even be dangerous.*

WILLIAM EVANS

Who has the most dangerous job on prime-time entertainment television? The police officer? The soldier? The private investigator? The answer is "none of the above." On prime-time entertainment television, scientists are most at risk. Ten percent of scientists featured in prime-time entertainment programming get killed, and five percent kill someone. No other occupational group is more likely to kill or be killed (Gerbner 1987).

Popular entertainment media have long portrayed scientists as mad, bad, and dangerous to know, but in the past few decades entertainment media portrayals of science have changed significantly, and these changes seem to have accelerated in recent years. Science remains dangerous, but it is also increasingly portrayed as useless in solving problems. The skepticism about paranormal claims that is a part of scientific thinking is portrayed as a handicap. And in many newer

Patrick Hubenthal

result, Carol Anne suffers repeated and terrifying encounters with otherworldly entities. Dr. Seaton seems cruel, and his continued skepticism in the face of incontrovertible evidence seems almost pathological.

Fortunately for Carol Anne, a psychic arrives to save her. The psychic, named Tangina, becomes aware of Carol Anne's plight via telepathy and rushes to help her, only to be rebuked and ridiculed by Dr. Seaton. As the peril to Carol Anne and others grows, and Dr. Seaton refuses to accept Tangina's warnings about the great power of supernatural forces, Tangina demands that Carol Anne's uncle and aunt (with whom Carol Anne is living) make a choice: They must choose between Tangina's mysticism and Dr. Seaton's rationalism. The uncle and aunt decide to follow Tangina's recommendations and to reject Dr. Seaton's counsel. When Dr. Seaton objects, the previously restrained uncle treats him harshly, calling the psychologist's diagnoses "stupid and idiotic." The outcome of this confrontation is meant to be pleasing to an audience that has witnessed Dr. Seaton's increasingly strained and, finally ludicrous, attempts to find prosaic explanations for fantastic events. Shortly after this confrontation, Dr. Seaton is killed, pushed down an elevator shaft by a teenager who is possessed by evil spirits. At this point, the real work of saving Carol Anne can begin, and sure enough it is a combination of faith and benevolent psychic power that in the end save Carol Anne and her loved ones from the malevolent spirits.

While the portrayal of Dr. Seaton is perhaps unusually negative, skeptics are frequently portrayed by Hollywood as being dogmatic, misanthropic, and just plain wrong. In films such as *Poltergeist III, The Entity,* and even *Ghostbusters* (where the skeptic is the U.S. Environmental Protection Agency official who insists that it is the ghostbusters rather than ghosts who are responsible for an epidemic of strange phenomena and whose order to shut down the ghostbusters' "containment system" brings predictable, dire consequences), skepticism is shown to be foolish and inefficacious, while psychics and parapsychologists step in to eliminate the paranormal threats.

Hess (1993) and Tudor (1989) identify the transition from skepticism to credulity as a major theme and distinguishing feature of recent horror and suspense movies. People who live in haunted houses (e.g., as in *The Amityville Horror*), or find their loved ones possessed or pursued by demons (e.g., *The Exorcist, Poltergeist*), or find themselves immersed in satanic conspiracies (e.g., *Rosemary's Baby, The Omen*) typically are at first skeptical regarding the supernatural; but their safety and

even their survival require that they acknowledge the reality of the supernatural. In these films, to deny the reality of the supernatural is to place oneself and one's loved ones at risk. As audience members, we often find ourselves rooting for skeptical characters to forsake skepticism. Sometimes a converted skeptic must work to convert other skeptics, to make others recognize the reality and danger of the supernatural. Here again, audience members often find themselves rooting for successful evangelization, since the survival of one or more likable characters, and perhaps even the world, depends on it. The power of these narratives is such that even dedicated skeptics often find themselves cheering when a skeptical character comes to believe in the supernatural.

## The Paranormal Becomes Normal

While skeptics should be distressed by films that portray the transition from skepticism to credulity as a matter of life and death, at least these films acknowledge that skepticism is an understandable first response to fantastic claims and wondrous events. In these films, the major characters typically at first consider prosaic explanations, even though they soon become convinced that supernatural forces are at work. These films reassure us that the major characters are not eager to believe in the supernatural, that they are sensible, normal people. (In fact, very few mainstream entertainment media offerings portray the victims of the supernatural as having had an interest in the supernatural before they became victims, even though in the real world a previous interest in UFOs, demons, and other paranormal phenomena is characteristic of those who claim to have encountered such phenomena.)

Actors Gillian Anderson and David Duchovny play FBI agents Dana Scully and Fox Mulder on "The X-Files."

In contrast to entertainment media offerings in which skepticism is portrayed as a normal, if untenable, response to fantastic claims, the television series "The X-Files" presents a new and potentially pernicious portrayal of the paranormal as entirely normal. In "The X-Files," FBI agents Fox Mulder and Dana Scully investigate paranormal events in the same routinized, "it's all in a day's work" manner in which "Dragnet's" Sergeant Friday and Officer Gannon investigated armed robbery and petty theft. Paranormal events are mundane, "The X-Files" suggests, and even an initial but quickly abandoned skepticism is no longer warranted. Agent Mulder is always ready (and often eager) to consider the possibility that paranormal forces account for the phenomena he is investigating, and his hunches typically prove to be correct. In conversation, Mulder and other characters are fond of offering offhand and even wholly gratuitous, credulous references to a wide variety of paranormal phenomena. Emery (1995) aptly characterizes these references as "extraneous poppycock."

Agent Scully plays "The X-Files'" token skeptic, but as Emery (1995) notes, Scully's skepticism is often a symptom of her closed-mindedness. Like Dr. Seaton in *Poltergeist III,* Scully remains skeptical even after she has witnessed remarkable and unequivocally paranormal events. Her skepticism is seldom shown to be useful or warranted, and in recent episodes she seems decidedly less skeptical (a change that should perhaps be expected given the many paranormal forces and extraterrestrial beings she has encountered in the show's first two seasons).

"The X-Files" achieves a kind of realism that sets it apart from previous television science fiction series such as "The Twilight Zone" and "The Outer Limits." "The X-Files" adopts the quasi-documentary style of recent television police dramas, appropriates the authority and prestige of the Federal Bureau of Investigation, and suggests that "The X-Files" cases are similar to real cases. "The X-Files" perhaps has more in common with shows such as "Unsolved Mysteries" and "Sightings"—shows in which allegedly real paranormal events are often reenacted—than it does with older shows such as "The Twilight Zone." In following the discussions of "The X-Files" fans on the Internet, it becomes clear that, while most fans do not believe "The X-Files" to be a documentary (although a few fans seem to have trouble distinguishing fact from fiction), many believe that "The X-Files" cases are highly plausible and that the FBI and other government agencies are actively, if secretly, investigating similar cases.

In popular entertainment prior to "The X-Files," skepticism was necessary, if only to provide an obstacle for the protagonists to overcome. In "The X-Files," skepticism is almost wholly unnecessary. Although it remains to be seen if future entertainment media offerings will follow the lead of "The X-Files," the total immersion of "The X-Files" in the paranormal is worrisome. It suggests that paranormal events are common and that even likable, educated, and attractive people like agents Mulder and Scully can embrace the supernatural.

## Skepticism and Hollywood

Skeptics have had some success in persuading journalists to include a skeptical point of view in news stories about the paranormal, although, clearly, more needs to be done in this regard. Unfortunately, Hollywood accords skeptics no standing to address the portrayal (or the absence) of skepticism in film and television. Many film and television producers would no doubt claim that because their products are merely enter-

*Science continued on 58*

# Science and Pseudoscience

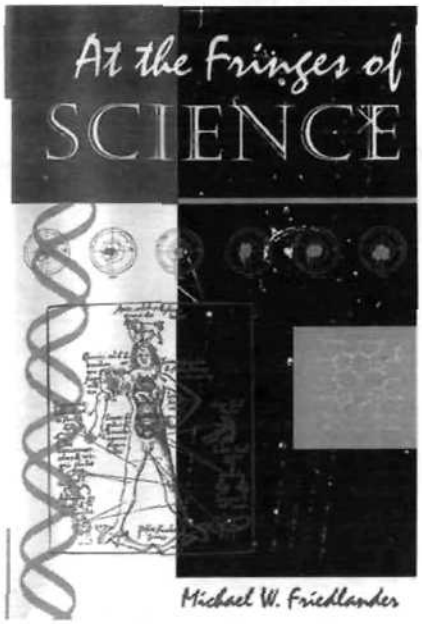
BARRY MARKOVSKY

*At the Fringes of Science.* By Michael W. Friedlander. Westview Press, Boulder, Colo., 1995. 196 pp. Hardcover, $24.95.

In the author's words, "This book has as its central theme the separation of science from pseudoscience and the identification of correct science against a background of errors and impostors that is often present" (p. 159). Michael W. Friedlander, in *At the Fringes of Science,* strikes a careful balance between recounting well-chosen historical cases, analyzing their most salient features, and discussing the more general issues exemplified by the cases. He does not purport to offer a definitive set of demarcation criteria distinguishing science from pseudoscience—a riddle that has, thus far, stumped many a good mind and likely has no definitive solution. Instead, with admirable, straightforward prose, he documents the multidimensionality of scientific and would-be scientific endeavors. In essence, he concludes that what separates the light of science from the darkness of pseudoscience is a long, shadowy dusk. There are no clear boundary lines.

After Friedlander sets the stage in the first chapter, the second reviews two "oldies but goodies": Immanuel Velikovsky's weird astronomy, and fraudulent claims for a compound that supposedly extended the life of car batteries. These cases were characterized as extreme forms of pseudoscience. In contrast, Chapter 3 reviews two cases that were taken seriously by science, though with very different outcomes: Alfred Wegener's theory of continental drift, and the notorious Fleischmann-Pons cold fusion fiasco.

The inclusion of chapters titled "Science and its Practice" (4) and "The Machinery of Science" (5) contribute to this book's uniqueness. Friedlander is a physicist, and too few working scientists make an effort to describe from the inside how science operates, warts and all. In Chapter 4 he portrays science as a human endeavor of less-than-perfect efficiency, vulnerable to being sidetracked by fraud, ignorance, or politics. At the same time, however, he points out that its successes are undeniable: Science has proved to be vastly superior to alternatives for its expressed purposes. To be sure, its self-correction mechanisms are sometimes foiled in the near-term and its detractors revel in trumpeting cases of scientific fraud, abuse, and self-deluded demagoguery. The obverse argument seems to elude the detractors, however, for their pet cases are nearly always uncovered, investigated, and disposed of within the family of science.




Chapter 5 provides sufficient detail on the internal communication processes of science to show how this self-policing is possible, and why, generally, it works so well. Freidlander describes and illustrates the workings and interactions of peer review processes, journals, conferences, collegial networks, professional organizations, and graduate training.

Chapter 6 reviews several "Respectable Maverick Ideas": the hypothesis that global cooling and dinosaur extinction followed an asteroid strike of Earth; the special and general relativity theories of Einstein; the Big Bang theory in cosmology; and quantum mechanics. By juxtaposing these ideas with those holding sway in their respective fields, Friedlander dashes the stereotype that mainstream science is rigid and closed. Instead, his cases show that when it comes to considering radical ideas, science is (properly) conservative but not fatuous.

The next chapter, "Walking on Water or Skating on Thin Ice," describes

two cases of maverick ideas greeted with suspicion from their inceptions. In the 1960s Russian scientists claimed to have discovered "polywater" and experimentally demonstrated its strange properties. More familiar to readers of the SKEPTICAL INQUIRER will be the claim from Jacques Benveniste's team that water can "remember" substances once dissolved in it, but subsequently removed through dilution. These cases illustrated what Friedlander calls "the transition away from mainstream science"; and Chapter 8, on "Tabloid Science," completes the transition. Here he reviews astrology, the "Jupiter Effect," the 1990 earthquake predictions at the New Madrid fault, and claims regarding visitors from outer space.

"Psience," the title of Chapter 9, provides a good, dispassionate overview of the field of parapsychology. The summary is, of necessity, selective; and it is not current insofar as presenting the most recent experimental evidence being offered for psi. However, with its treatment of claims by serious researchers such as Charles Honorton and Robert Jahn and its summaries of skeptics' analyses through the years, the major points are made more than adequately. Friedlander neither dismisses nor praises the work in this field, but closes the chapter with a cautionary note, one of the best lines in the book: "Each generation's best case of psi is cast aside by subsequent generations of parapsychologists and is replaced by newer 'best' cases. It has been, in the words of that noted philosopher of science Yogi Berra, a case of déjà vu all over again."

Fraud is the subject of the tenth chapter, and the author takes a sophisticated, multifaceted view of the effects of fraudulent and quasi-fraudulent claims. He first describes some relatively blatant cases such as psychologist Cyril Burt's doctored data and René Blondlot's elusive N-rays. Next, Friedlander presents cases where allegations remain unsolved: the authenticity of some Himalayan fossils, and allegations of data fabrication against Nobel Prize winner David Baltimore. Research conducted by Robert Millikan, another Nobel Prize winner, was placed in a third category. It seems that Millikan may have ignored some of his "noisy" data in reaching conclusions that nevertheless proved sound.

The Lysenko affair in Russia, Nazi science, and creation science form the core of Chapter 11, "Political Pseudoscience." Each field is placed in the context of its host society, and each illustrates ways that nonscientific interests impede scientific progress. The next chapter, "Taking Stock," takes a step back from the book's central issues, providing an integrative discussion of the meaning of scientific facts, past offerings of demarcation criteria, experimental bias, statistical significance, and more. The final chapter deals with "Responding to Fringe Science"—what must be done both within and outside of science to reduce the incidence of pathological science and public misconceptions.

Although all of its factual content can be found elsewhere, *At the Fringes of Science* offers a combination of depth, breadth, gentility, and synthesis that is unique in the skeptical literature. Fringe claims are treated with due respect, cases are given adequate space for reasonably detailed—but not tedious—descriptions, and always their links to broader issues of theory and method are intelligently drawn. There is philosophy of science without posturing or platitude, and sociology of science without ideology or interpretive tangents.

I have adopted the book for a graduate course in sociology called "Theory Construction and Analysis." For my students it is an excellent entrée into discussions about what science is and what it is not, and to what degree areas of contemporary social sciences are pseudoscientific. At the same time, Friedlander's clean style of writing opens the work to a much broader audience. In addition to its potential as a supplemental text in college courses, it would be nice to see Westview Press also pursue a more general readership for *At the Fringes of Science*. It is a superb book and I hope that it will be widely read. □

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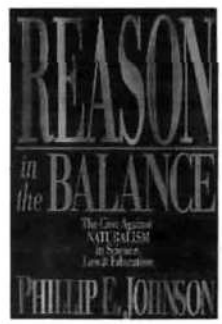


# Flight From Reality

THOMAS H. JUKES

*Reason in the Balance: The Case Against Naturalism in Science, Law and Education.* By Phillip Johnson. InterVarsity Press, Downers Grove, Ill, 1995, 245 pp. Hardcover, $19.99.

*Reason in the Balance: The Case against Naturalism in Science, Law and Education* is Phillip Johnson's second book; the first was *Darwin on Trial*. Now he is putting naturalism on trial. A dictionary definition of naturalism is "a theory that denies that anything in reality has a supernatural or more than a natural significance; the doctrine that cause-and-effect laws are adequate to account for all phenomena."

Johnson starts his introduction, "According to public opinion polls, the vast majority of Americans [including Johnson, who says he is a "theist-realist"] are theists, which means they believe (or at least say they believe) that we were created by God, a supernatural being who cares about what we do and

has a purpose for our lives which is to be fulfilled in eternity."

Since Johnson is a lawyer, let me quote U.S. District Court Judge William R. Overton (1982):

> No doubt a sizeable majority of Americans believe in the concept of a Creator or, at least, are not opposed to the concept and see nothing wrong with teaching school children about the idea.
>
> The application and content of First Amendment principles are not determined by public opinion polls or by a majority vote. Whether the proponents of Act 590 constitute the majority or the minority is quite irrelevant under a constitutional system of government. No group, no matter how large or small, may use the organs of government, of which the public schools are the most conspicuous and influential, to foist its religious beliefs on others.

Act 590 was the Arkansas law stating, "Public schools within this state shall give balanced treatment to creation-science and to evolution science." We are fortunate that theists are enjoined against intervening in science education.

Johnson deplores the predominance of naturalism in education. "A person or society that ignores the Creator is ignoring the most important part of reality, and to ignore reality is to be irrational," he says. Thus he condemns the ignoring of reality and at the same time his book opposes naturalism, which relies on reality instead of superstition.

Johnson uses much space in *Reason in the Balance* to defend his earlier book, *Darwin on Trial*. He says, "I debated the critics in print and before audiences all over the United States, enjoying the experience immensely. The debate gave me a thorough education in the relationship between naturalism and evolutionary science and on the true cultural importance of the theory of evolution." But if his pleas in *Darwin on Trial* had been successful, evolutionists would have had to make mention of them. Instead, they ignored him. Publications continued to present articles on evolution, at a level of sophistication several orders of magnitude higher than Johnson's, and there is no indication that he has read any of these articles.

Johnson notes that the majority of Americans are theists. But educational and economic levels are lower among creationists. As education improves, acceptance of naturalism and of reality increases. An analysis of this was published in *U.S. News and World Report*, December 23, 1991. It showed that creationism, as defined by the premise that "God created man pretty much in his present form within the last 10,000 years," was believed more by those with no high school diploma (65 percent), and an income of less than $20,000 (59 percent) than by college graduates (25 percent) and those with an income of more than $50,000 (29 percent). Those who believed that God had no part in the process of evolution of human beings were 3.6 times as likely to be college graduates as those who believed that God guided the process.

Johnson notes that natural science is based on naturalism, which is dominant in the intellectual world. He says, "Suppose that parents in a particular public school district want their children to be exposed to the arguments against the theory of evolution *or want their teenagers to be told to save sex for marriage*" [emphasis added]. "Those parents are unlikely ever to get their way."

The reason that the arguments against the theory of evolution are not taught in school science classes is that these arguments are expounded by creationists and have an "inescapable religiosity." This led to the U.S. Supreme Court decision in 1987 against the teaching of creationism. The decision denied scientific status to "creation science." The supposition about sex education is irrelevant to the question of theism versus naturalism; it may well be that many believers in naturalism deplore teenage pregnancies.

Darwin's *On the Origin of Species by Means of Natural Selection*, published in 1859, proposed that evolution had taken place, and gave natural selection as its mechanism. Later development of the theory of evolution led to the conclusion that terrestrial living organisms had descended from a common ancestor by a series of inherited changes such as mutations. Harmful mutations were rejected by natural selection. The discovery and study of sequences in molecules of DNA and proteins confirmed Darwinian evolution by showing that molecular changes led to phenotypic changes upon which natural selection acted. As Theodosius Dobzhansky pointed out, "Nothing in biology makes sense except in the light of evolution." Douglas Futyama said that evolution "is one of the most important discoveries of science, and one of the most profound concepts in Western thought." But Phillip Johnson refuses to accept this. Another Johnson, Samuel Johnson, said in 1784, "I have found you an argument. I am not obliged to find you an understanding." In other words, we can give an explanation, but we cannot impart the ability to comprehend it. Strangely, the dust jacket of *Reason in the Balance* says that "makes a convincing case for

**"The reason that the arguments against the theory of evolution are not taught in school science classes is that these arguments . . . have an 'inescapable religiosity.' This led to the U.S. Supreme Court decision in 1987 against the teaching of creationism."**

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the liberation of nature . . . from naturalism's claim that reality is less than we know it to be. In advancing this argument, Phillip Johnson proves himself a worthy heir of Samuel Johnson." (!)

One chapter attacks Richard Dawkins's book *The Blind Watchmaker.* Johnson claims that Dawkins's arguments are incompatible with the Cambrian explosion. In Chapter 5, Johnson quotes the epistle of Saint Paul to the Romans: "Claiming to be wise, they became fools and they exchanged the glory of the immortal God for images resembling a natural human being, or birds, or reptiles." This, says Johnson, means that those who turn away from God and toward naturalistic philosophy give up their minds and end up endorsing sophisticated nonsense and nature worship. He calls for Christian theists "to argue that preexisting intelligence really was an essential element in biological creation."

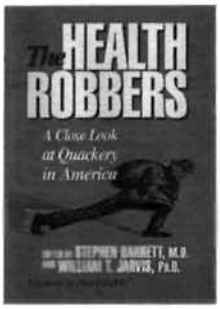
After the huffing and puffing against naturalism, Johnson (p. 204) finally sums things up:

> The scientific naturalists claim to have absolute truth, and . . . they reject theistic religion as false. That they retreat so quickly when firmly challenged shows that their truth is built on a foundation of sand. . . . The essential factual premise is that God created us for a purpose, and our destiny is a glorious one in eternity. The right question is how things got to be in such a state of confusion. The answer is that humans saw the glory of God . . . but chose to turn their own way and fashion idols of their own making—the latest fashion in idols being the grand metaphysical story of science.
>
> The way out? The good news is so simple a child can understand it at once, and so subtle that the greatest intellects never quite get to the bottom of it. "In the beginning was the Word, and the Word was with God, and the Word was God. . . . For God so loved the world that he gave his only Son, so that everyone who believes in him may not perish but may have eternal life."
>
> That's the way things really are, and recognizing how things really are is the beginning of reason.

Johnson's "how things really are" does not provide for religions other than Christianity. His arguments are an inadequate answer to the exploration of our world, and the universe, by naturalism.

I organized a symposium at the meeting of the Federation of American Societies for Experimental Biology (FASEB) in 1983. One of the speakers was emeritus dean of Grace Cathedral in San Francisco, the Reverend Julian Bartlett. He said, "God is the author of all truth. We discover only that which he chooses to unveil, or to make available for unveiling." And in this, the Reverend Bartlett included evolution. He said, "The knowledge given us by the truly scientific view of evolution has done biblical religion a great service."

And this is the best answer to Johnson. □




# Schemes and Scams in Health Care

WOLF RODER

*The Health Robbers: A Close Look at Quackery in America.* Edited by Stephen Barrett and William T. Jarvis. Prometheus Books, Amherst, N.Y., 1993. 526 pp. Hardcover, $25.95.

*The Health Robbers: A Close Look at Quackery in America,* is not really meant to be read from cover to cover. It is a heavy, 526-page tome edited by Stephen Barrett and William T. Jarvis, two experts on the gamut of health schemes, scams, frauds, fakes, hustles, hoaxes, deceits, shams, and stratagems. In 36 chapters the editors and their contributors explain a great variety of quackeries. They explain "how quackery sells." It is, in other words, a great reference book, and browsing in it can be instructive and fun.

Chapters are devoted to vitamin pushers, occult practice, alternative cancer treatment, exploiting arthritis sufferers, weight control and AIDS profiteers, chiropractors, homeopathy, organic ripoffs, hyping herbs, acupuncture, attacks on fluoridation, dubious dental care, gadgets, faith healing, eye exercises, holistic claptrap, and the mental-health maze. Two chapters are devoted to medical impostors and to fuzzy-thinking physicians, leaving me with the distinct impression that faking medical knowledge is quite easy. Other chapters contain warnings about attempts to make quackery legal, destructive quasireligious health cults, and health schemes reported in the news media. The last few chapters marshall some of the forces opposing quackery. The book has a long list of organizations to turn to for accurate information, and it addresses what the activist can do to fight quackery.

Astonishing to me was the description in the book of the large number of holders of M.D. degrees who act no better than quacks—who use their license to peddle homeopathy, vitamins, herbs, acupuncture, special foods, or a cure-all for claimed pervasive, but non-existent allergies. The section "Health Freedom Crusaders" examines arguments for freedom in the marketplace and objections to the monopoly of the "orthodox" medical establishment. What the quacks want, of course, is the freedom to peddle any "natural" or "organic" nostrum that is profitable, whether safe and effective or dangerously poisonous. □

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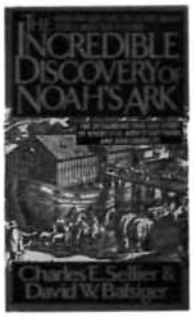


# Did You See CBS's 'Pseudodocumentary'? Here's the Book

DAVID PITT

*The Incredible Discovery of Noah's Ark.* By Charles E. Sellier and David W. Balsiger. Dell Publishing, New York, 1995. 356 pp. Paperback, $5.99.

Do we really need another book rehashing the story of Noah and the Flood? If the book is Charles E. Sellier and David W. Balsiger's *The Incredible Discovery of Noah's Ark,* the answer is no. Based on the 1994 CBS-TV "documentary" of the same name (featuring a man who said he possessed wood from the Ark) that turned out to be based on a hoax (see *SI,* News and Comment, Winter 1994), this book is a shining example of crackpot literature at its most cracked.

"This book is not a religious quest to prove the Bible," the authors assure us (p. 6), "but rather a scientific and archaeological search to discover, identify, and report the truth." In almost every imaginable way, this statement is absurd.

The (mostly) literal interpretation of the Bible, in particular Noah's story, is central to this book. The reader is expected to take traditional symbolic or mythological references as literal truth. For example, we learn (pp. 118-119) that, prior to the Flood, "Man lived for more than 900 years" [meaning humans could live to be 900 years old]. Of course this is silly, and most scholars do *not* take such statements literally. But apparently Sellier and Balsiger do not feel it is necessary to discuss this.

The book frequently requires great leaps of logic. Many writers (e.g., Kenneth Feder, *Frauds, Myths, and Mysticism,* Mayfield, 1990) point out that the construction of the Ark, given the conditions stated in the Bible, would probably have been impossible. Sellier and Balsiger try to get around this by using the popular what-if argument (p.18):

> According to the Book of Genesis, Tubal-Cain "forged all kinds of tools out of bronze and iron." The Bereshith Rabba Jewish tradition tells us that Naamah, the sister of Tubal-Cain, was Noah's wife. If that is true, then it would be logical to assume that Noah had access to metal tools to aid him in the construction of the Ark.

None of this is proof of anything, and by page 29 it becomes : "We know Noah had access to . . . metal tools. . . ."

The authors claim their book is not a "religious quest to prove the Bible," but a close reading of the book's index, bibliography, and footnotes tells a different story. *The Incredible Discovery of Noah's Ark* is, perhaps unintentionally, a work of creationist propaganda. (The CBS-TV "documentary" was skewered by an actor in the production who said he made up the story of finding the wood to expose the intent of Sun International Pictures to foist "religious propaganda" on the public. Sun International Pictures has copyrighted this book.

It would take far too long to examine each of the book's creationist elements, but here are a few. The authors rely on the "expertise" of such luminaries as Frank Marsh (a protégé of George McCready Price, the granddaddy of Flood theorists), gap theorist Arthur Custance (gap theory is a way of accommodating the geological evidence that the world is old with a literal reading of the six days of Genesis), John Morris (identified everywhere but in the appendix simply as a geologist), and Tim LaHaye, a founder of the Christian Heritage College and (according to author Ronald L. Numbers) a "famous fundamentalist."

Whitcomb and Morris's classic *The Genesis Flood* also is named in the book, as a legitimate work of science. Nowhere in this book will you read of the bad science and irresponsible reasoning in *The Genesis Flood.* In fact, nowhere in the main body of the text of *The Incredible Discovery of Noah's Ark* will the reader find any discussion of creationism, let alone a balanced treatment of any skeptical point of view.

Of course, it isn't a crime to write a book from a creationist standpoint. But one wonders why the authors "buried" their experts' creationist affiliations. For example, Stephen Austin is identified in the main text as "professor of geology at the ICR Graduate School in San Diego, California," but no mention is made of the fact that the ICR Graduate School is an "arm" of the Institute for Creation Research, and that this "school" is in business to teach creationist doctrine only. (In 1990, the State of California pulled the school's teaching license, although a federal judge gave it back. (See Numbers, *The Creationists,* Knopf, 1992.)

*The Incredible Discovery of Noah's Ark* comes across as a book with something to hide, a pro-creationist tract masquerading as scientific inquiry. The title itself is a cheat, since we never do discover anything. The book is a collection of familiar, unverified sightings and unproven theories, accompanied by photographs that show nothing. Readers of other Ark books will recognize familiar material in this one. And the promised "compelling new scientific evidence" is a staggering letdown.

It would be easy to dismiss this book as silly nonsense, but it is published by a respected company. It has the potential to be read by millions of unsuspecting people. As science, as biblical scholarship, as adventure, it fails miserably. But it may, unfortunately, succeed in its ultimate aim: to teach its readers that creationism is the one true faith. □

*David Pitt is a columnist and reviewer for* Mystery Review. *He also freelances for various newspapers and magazines and is a fledgling investigator of paranormal claims.*

## NEW BOOKS

***Alternate Realities: The Paranormal, the Mystic, and the Transcendent in Human Experience.*** **Leonard George.** Facts on File, 460 Park Avenue South, New York, NY 10016. 1995. ISBN 0-8160-3213-0. 360 pp. $18.95, paper. A valuable reference book dealing with virtually every reported type of "unusual experience," including psychokinesis, mystical or hallucinatory visions, out-of-body experiences, sensory anomalies, automatized experiences, unusual natural phenomena, deliberately induced experiences, and scores of others. Entries are arranged alphabetically, most ranging from a paragraph to a page in length. In each, George, a Vancouver, B.C., clinical psychologist, explains the characteristics, the methods of research used, the evidence provided, and possible scientific explanations. A useful directory lists the entries by general categories. The 20-page bibliography includes abundant skeptical sources, and there is a detailed index.

***Astronomy for the Layman: Reality Before Belief.*** **Carl Zimmerling.** Rainbow Books, P.O. Box 430, Highland City, FL 33846-0430. 1995. ISBN 1-56825-026-6. 377 pp. $29.95, paper. The author, an amateur astronomer and science buff who has read widely in the world's religions, provides facts and theories of astronomy versus the ancient mythical universe.

***The Crazy Waitress Tapes.*** **Ian D. MacDonald.** Tiree Books, 10 Middleton, Menstrie, Clackmannanshire, Scotland FK117HA. 1995. ISBN 0-9525154-0-7. 96 pp. £14.95, paper. Subtitled *New Age Space Revelations from Inside the Eponymous Flying Saucer Complete with UFO and ETI Illustrations.* Purported tapes of a UFO encounter. Humor.

***Sai Baba's Miracles: An Overview.*** **Edited by Dale Beyerstein.** B. Premanand, Indian CSICOP, 11/7, Chettipalayam Road, Podanur 641 023 (Tamil Nadu), India. 1995. 128 pp. Overseas U.S. $10 or equivalent, paper. A summary of the paranormal claims made about Indian guru and holy man Sri Sathya Sai Baba and the various investigations of them.

***Science versus Miracles.*** **B. Premanand.** B. Premanand, Indian CSICOP, 11/7, Chettipalayam Road, Podanur 641 023 (Tamil Nadu), India. 1995. 131 pp. Overseas U.S. $15 or equivalent, paper. Premanand, the noted Indian magician and tireless investigator of gurus and "godmen," here explains the tricks behind 150 "miracles." Examples: creating holy ash, making a match box appear or disappear, "psychically" bending spoons, lifting heavy objects with only the fingers, lighting candles simply by touching them, reading a message in a sealed cover, moving objects by mental power, piercing a balloon without bursting it, levitating, and so on.

*—Kendrick Frazier*

## ARTICLES OF NOTE

**Burns, John F. "India's 'Guru Busters' Debunk All That's Mystical."** *New York Times,* October 10, 1995, p. A3. Report from Calcutta on activities of members of the Indian Science and Rationalists' Association in exposing fraudulent "godmen" and other gurus, swamis, and yogis who use magicians' techniques in claiming they have mystical powers. The association's president, Prabhir Ghosh, has been in a lifelong battle against the supernatural. "I saw how people were being fooled," he says. "And I saw how this fraudulent spiritualism was being used to exploit the poor." A photograph shows Ghosh holding a fake human skull, typical of tricksters' props.

**Dawkins, Richard. "God's Utility Function."** *Scientific American,* November 1995, pp. 80-85. Humans naturally seek purpose in everything, including living creatures. Nature is not cruel, "only pitilessly indifferent," says Dawkins. "This lesson is one of the hardest for humans to learn." The noted zoologist here says organisms exist to ensure the survivability of their DNA. The true "utility function of life"—that which is being maximized in the natural world—is DNA survival. "This principle, once recognized, explains a variety of phenomena that are otherwise puzzling." From his 1995 book *River Out of Eden.*

**Forman, Paul. "Truth and Objectivity, part 1: Irony."** *Science,* 269:465-467, July 28, 1995. The first of a two-part review considering recent reevaluations of science by historians and sociologists. Critiques Megill's *Rethinking Objectivity* and Appleby et al.'s *Telling the Truth About History.*

**Forman, Paul. "Truth and Objectivity, part 2: Trust."** *Science,* 269:707-710, August 4, 1995. The second of Forman's two-part review (above). This one critiques Shapin's *A Social History of Truth* and Porter's *A Trust in Numbers.*

**Schnabel, Jim. "Tinker, Tailor, Soldier, Psi."** *Independent on Sunday,* (London) August 27, 1995, pp. 10-13. Good journalistic report on the attempts to use "remote-viewing" and other psychic phenomena by some members of the United States intelligence community (including the DIA, CIA, NSA, FBI, Secret Service, and other military agencies) over the past two decades. Deals with Hal Puthoff, Maj. Gen. Albert Stubblebine III, Jack Verona, Ed Dames, and Mel Riley. Nothing much came of all this, and some of the programs were disbanded or driven underground. Schanabel says that in 1988, as part of a wide-ranging review of potentially embarrassing Pentagon programs, a Department of Defense Inspector General's (IG) team descended on the remote-viewing unit's offices at Ford Meade, Maryland. This was formerly an Army unit headed by Stubblebine until 1986 when the Army expelled it; then a Defense Intelligence Agency unit overseen by Verona, chief of DIA's science and technology directorate. The IG team demanded to see the files, but people in the unit first managed to shred or dispose of many of them "in the spirit of Oliver North." Recruitment of new remote-viewers was suspended. The Russian program that stimulated all this as part of the Cold War competition is rumored to have met a similar fate.

**Taubes, Gary. "Epidemiology Faces its Limits."** *Science,* 269:164-169, July 14, 1995. Thoroughly reported, insightful examination of the problems that afflict both scientific studies and news media reports about subtle links between diet, lifestyle, or environmental factors and disease. Contradictory evidence from a flurry of reports of diverse scientific significance has created what Lewis Thomas once described as "an epidemic of anxiety." Some strong associations have been definitely demonstrated (smoking and lung cancer, for example), but many epidemiologists concede that their studies are so plagued with biases, uncertainties, and methodological weaknesses that they may be inherently incapable of accurately discerning weak associations. One useful recommendation is that no *single* study reporting a new cause for cancer should be taken seriously unless the agent in question increased a person's risk by at least a factor of three. Even then, skepticism is in order unless the study was large, extremely well done, and biological data support the hypothesized link. The fundamental question, one researcher says, is: "What is the quality of the data, and to what extent are there biases in the data that cannot be controlled by statistical analysis?" A sidebar by Charles C. Mann, "Press Coverage: Leaving Out the Big Picture," is critical of the news media for reporting uncritically on individual weak studies without sufficient context and of ignoring data that show negative results. A number of epidemiologists reply in letters to the editor in 269:1325-1328, September 8, 1995.

*—Kendrick Frazier*

# Looking Up To Logic

BRYAN FARHA

Imagine you live in the small city of Salina, Kansas. As is typical of Kansas weather, it is a fairly windy morning. There is much debris blowing in your front yard, including leaves, branches, and twigs; the children's toys; and garbage resulting from the trash container having been blown over.

On the lawn of your residence, about twenty feet from your doorstep, you see what looks like a newspaper amongst all the debris. Because of the adverse conditions, it is somewhat difficult to *clearly* see the print on the paper. But you do not subscribe to the local newspaper. Upon further inspection, and to your absolute bewilderment, you seem to be able to make out the words *"London Times"* at the top. Also on page one, there appears to be a large photograph of the football team that won the Super Bowl the previous day. The images are a bit fuzzy, but it certainly seems as though the *London Times* is headlining the previous day's Super Bowl, which is not unusual for any paper. It seems rather bizarre, however, that an apparently current newspaper from another country would find its way to your lawn in Salina, Kansas. You do not, nor have you ever, subscribed to the *London Times*. Your curiosity and interest are escalating. So you go to your bedroom to put on a robe and slippers and then go outside in order to get a much closer look to determine if your eyes are deceiving you. But now, the "phantom" paper is gone. You check your neighbors' yards, but no paper is in sight.

How can this experience be explained? There are several possibilities. But the question must be addressed from two perspectives: (1) Was the perception, in fact, what the observer thought it was? (2) If the argument is plausible, under what conditions could it be accounted for?

Concerning the first perception, there are myriad factors to consider. Recalling the wind and resulting debris, was this actually a newspaper or could it have been wrapping paper, someone else's trash, or even reflected sunlight? If, in fact, it was a newspaper, can we *verify* that it was the *London Times?* That it was a photograph of the recent Super Bowl champions on the front page? What tangible *evidence* exists of your experience?

Concerning the second perception, how does a current issue of the *London Times* find its way to your residential lawn in Salina, Kansas? It is possible that the newspaper belonged to a neighbor and the wind blew it into your yard; this notion is easily supported or refuted with a small degree of legwork. But if this legwork does not yield a satisfactory explanation, we might then ask a series of other questions. If this, too, fails to provide adequate explanation, we then become faced with very tenuous possibilities. One such possibility is that a newspaper carrier from London, England, came to Salina, Kansas, by plane and delivered the paper to your house. Remote as this seems, it *is* a possibility. Not a perfectly logical or feasible answer, but the *possibility* is there.

It is at this point that drawing plausible conclusions based on *logic* becomes critical. Unfortunately, it is also at this point that much of the general public errs in drawing conclusions based on available evidence. A case in point: An object in the night sky is unidentified. This *does* make the object a UFO. But the term "UFO" only means that the object cannot be identified. If evidence is insufficient to ascertain its identity (or its reality), then the conclusions we can draw are very limited. Why, then, do so many jump to the conclusion that *if we can't identify the object, then it must be an alien spacecraft from another solar system or galaxy?* Understand, it might be an alien spacecraft, but before we can draw this conclusion we must have *substantial* evidence. Assuming that an unidentified object in the sky is an alien spacecraft is as tenuous and potentially erroneous as attributing the arrival of the English newspaper to Salina, Kansas, via a London carrier traveling by airplane. Yet in the newspaper example, we easily recognize the faulty thinking involved in making the assumption (hypostatic leap) of a Londoner making an unexplained home delivery to a nonsubscribing Kansas resident.

Why, then, does the UFO phenomenon seem to change the *thinking process* of so many? Is the UFO phenomenon,

as well as other potentially anomalistic (paranormal) experiences, so intriguing that people *allow* it to alter their understanding of logical thinking? It is *possible* that alien spacecraft visit Earth, that abductions occur, that evangelists can reverse disease, that objects can move without apparent impetus, and that "ghosts" exist. But a word of caution: We cannot make positive conclusions about these phenomena without evidence, substantiation, and the use of logic. In other words, the *scientific method* must be employed as the basis for drawing conclusions regarding paranormal claims. Science is not a panacea for all explanation, but regarding paranormal claims it remains, by far, the best method. Let's not fall into the trap of abandoning science and logic because of curiosity and imagination. Rather, let's use curiosity and imagination as a springboard to the scientific method in order to draw accurate conclusions regarding mysteries of the universe. □

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# Don't Bother Me With The Facts:
## The Simpson Case and Rational Thought

ELIE A. SHNEOUR

In the welter of words written and spoken in the wake of the O. J. Simpson trial and its outcome, one fundamental consideration underlying this sordid saga has been all but ignored. After all the stridency was spewed on justice and justice corrupted, legal ethics tainted, racism exacerbated, and commercialism run amok, one issue emerges with a stark and depressing clarity. It is that rational thought, the ultimate basis for action on which the survival and prosperity of our civil society depends, has been decisively trashed once again, once too often for comfort. Too much has been said about the larger symbolism of the trial and too little about the fact that the O. J. Simpson trial was, first and foremost, a forum to adjudicate facts, assign blame, and apply punishment commensurate with the brutal murders of two innocent people, Nicole Brown Simpson and Ronald Goldman.

First of all, rational thought dictated that the physical, circumstantial evidence be as judiciously examined as witness accounts would have been. Circumstantial evidence usually requires much more of a mental effort for a juror to visualize than what a witness may contribute, but circumstantial evidence often can be more objective and more compelling, as it was in this case. Despite its many problems, the circumstantial evidence adduced in this trial was overwhelming. Rational thought in a functioning civil society requires that the circumstantial evidence should have been accorded weight above all other evidence. And, of course, rational thought compels a punishment consistent with the deeds committed. The abject failures of rational thought and action in the Simpson trial damages us all, but the black community most of all.

Racist police misconduct is intolerable, and the black community is unquestionably its major victim. But infinitely worse is the victimization of that community by criminals in its midst. Yet, mostly silence passes the lips of its leaders on the untold ravages of this plague. Empathy for victims of crimes, and cries for justice are meaningless unless they are applied to the whole of the human race, if universal justice is to be served. Unless and until the profoundly destructive dichotomy that exists within our civil society is cured, the racial dilemma, highlighted by the O. J. Simpson stunning acquittal, can only worsen. As long as rational thought is devalued by insisting that unsupported suspicions, folklore, or superstition should govern over plain, objective knowledge, our civil society will remain at risk. Knowledge, wrote the American philosopher William James (1842-1910), is that which you can put into action. And if there were any lingering doubts remaining about the importance of a Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP) in our society, the Simpson trial blew them away with a vengeance.

This is not the place to review the circumstantial evidence of the Simpson trial. That has been and will continue to be done *ad nauseam.* But lost in this process are a few salient facts that have been drowned by excruciatingly irrelevant and contradictory details. Simpson's defense team contributed its considerable share to this outcome. It needs to be emphasized that technology is not and has never been a substitute for reasoned judgment. And the proceedings in law share with the scientific method the same kind of thoughtful discipline on rules of evidence. Neither science nor

law ever has been the game of strategy that the media has made of them. Ideally, the world of jurisprudence is a rational anchor in a civil society. It is not the self-serving and self-contained universe that some of its practitioners have insisted it is by turning it into a mockery of justice for all.

Forget, for the moment, the trail of arcane DNA evidence which, for all its warts, is damning for the defendant. Consider instead some of the much simpler yet powerful evidence available from the massive records of the trial. Unfortunately for justice, that evidence is scattered through a miasma of noisy and meaningless chatter. But it is the human ability to distinguish fact from fiction that is at the core of the astonishing biological success of our species. The ability to think is a crucial asset, the development of which our educational system has abdicated, and which our political system has increasingly discouraged. And yet, any rational juror would have seen through the fog of confusion and reached the nub of the defining facts of the case. Let us examine a few of these.

Two stunning examples and a caution will suffice to make the point. The first example is the defense contention that detective Philip Vannatter could have planted O. J. Simpson's blood from the vial the detective carried in his pocket. But remember that the blood in that vial was drawn from O. J. Simpson *after* he returned to Los Angeles from Chicago. By that time, *most* of the blood evidence matching O.J. *before* he returned from Chicago already had been collected, tagged, and stored for analysis. The second example: If there were any cross-contamination with other blood, the control samples also would have been contaminated. That is what control samples are intended to determine. They did not exhibit any cross-contamination. Indeed, the defense team did not present a single shred of solid evidence that any of the collected blood was contaminated or planted. And finally, the caution is that although DNA may degrade and eventually become unreadable, it cannot change its identity in the process.

The take-home lesson for the skeptics' community is that the conduct and outcome of the Simpson trial has much in common with the majority of pseudoscience controversies valiantly challenged by CSICOP. In the face of irrefutable scientific evidence to the contrary, people continue to assert the validity of astrology, false memories, satanic events, outlandish conspiracies, megavitamin therapies, bogus cancer cures, and psychic phenomena. People insist on the existence of UFOs, the Loch Ness Monster, Bigfoot, the Bermuda Triangle, and now, milk-drinking statues. When challenged by powerful refuting evidence, the purveyors of these fictions usually change the subject. That is exactly what the O.J. defense team did by changing the subject from murder to Los Angeles Police Department racism. The possibility that there may be rampant racism within the LAPD should not in any way have absolved the defendant from these crimes. Under such circumstances we should be saddened but not surprised that the O. J. Simpson jury provided a devastating metaphor for the abysmal credulity that afflicts a reputedly modern society about to enter the twenty-first century. □

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## *Science* *from page 48*

tainment, neither viewers nor researchers should take "The X-Files" and similar offerings seriously. But this excuse is increasingly disingenuous as the evidence mounts that viewers' conceptions of reality are influenced by media entertainment programming (Gerbner et al. 1994). These same producers increasingly turn to docudramas, "reality-based" shows, tabloid journalism, and other program formats that owe their success in part to the strategic blurring of fact and fiction.

Hollywood television producers have agreed in recent years to work with experts to design portrayals that inform viewers about various health and environmental issues. Perhaps entertainment television and film producers can be recruited by scientists and skeptics to help ensure that critical thinking does not disappear from our entertainment media environment. Of course, it is perhaps easier to remind viewers that unprotected sex is dangerous or that aluminum cans can be recycled than it is to invite viewers to develop critical thinking habits, an invitation that would require producers to abandon their reliance on skepticism as a source of error and danger.

Carl Sagan (1995) implores television producers to work with scientists and skeptics to develop a nonfiction series that details how fantastic claims can be investigated scientifically—a kind of "Solved Mysteries." Such a series, Sagan suggests, could make for entertaining televison that would also encourage viewers to appreciate and cultivate the power of rational thought and rigorous investigation. Unfortunately, although many viewers would find such a series worthwhile, it may never reach an audience watching tabloid television. As a culture, we have long preferred that our tales of the supernatural be credulous rather than skeptical. Still, the breathless celebration of the paranormal in current films and television programs must be addressed. Understanding the need for media portrayals of skepticism is a necessary first step toward change. Skeptics would do well to identify or invent commercially viable alternatives, and entertainment media producers would do well to more often and more explicity acknowledge in their programming the important roles of science and reason in maintaining our civilization.

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## *Psychics* *from page 40*

that all three psychics believed that the scarf was involved in a suffocation, had had trouble with Crime 2, but had predicted that the shoe-related crime involved some form of burial.

Psychic 3 also thought that there had been a consensus on the scarf and shoe. Remarking on the lack of information forthcoming on Crime 2, the psychic noted that "sometimes access to information is not appropriate at certain times." Despite this, he said that he was "relatively pleased with the outcome."

In short, this study provided no evidence to support the claims of psychic detection and, as such, the results are in accordance with other controlled studies. The study utilized a novel method of evaluating psychic detection. The way in which the participants responded to being told the true nature of the crimes gives some insight into some of the mechanisms that might cause individuals to believe erroneously that they are able to solve crimes by psychic means.

### Notes


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1. Richard Wiseman contacted Sgt. Richard MacGregor of the Hertfordshire Police Force concerning this matter and received confirmation that the above statement was correct (personal communication, December 19, 1994).

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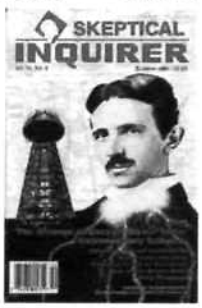


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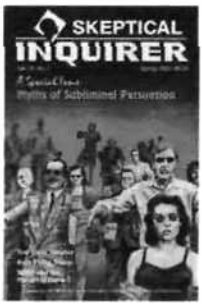


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## The Paradox of Knowledge

In the "Paradox of Knowledge" (*SI*, September/October 1995), Lee Loevinger writes, "As we light more and more figurative candles, the area of illumination enlarges; but the area beyond illumination increase geometrically." He means to imply that the act of creating knowledge also creates ignorance. What he fails to understand is that ignorance is not created; it simply exists. In other words, all of that darkness he can suddenly see was still there before he could see it.

Before the Space Age, no human being had ever seen the back side of the moon. Having now photographed the surface, we might decide that we need to see the real surface, underneath all of that unsightly dust, before we can claim to really have knowledge of the moon's back side. This illustrates Loevinger's notion that knowledge brings with it ignorance, but what he misses is this: that real but obscured surface existed *before* we saw the dusty plains, as did the necessity of discovering that real surface. Even before we saw the dusty surface, it was still necessary for us to map the clean surface before we could claim knowledge of the moon's surface. We just didn't know it yet.

In the beginning, when ignorance was perfect, all knowledge was absent. Most of that knowledge is still absent, but our *awareness* of its absence or non-absence in no way *affects* its absence. Similarly, our *lack of awareness* of its absence or non-absence also in no way *affects* its absence.

Information, being a product of the physical universe, must necessarily be limited by that universe. Thus knowledge, no matter how much vaster than the physical universe, must also be finite but unbounded (whatever that turns out to mean for knowledge). It also must already be out there, somewhere, waiting to be discovered—just as the physical universe is. As the saying goes, Newton didn't *invent* gravity, he *discovered* it.

Micheal C. Planck
Tucson, Ariz.

Lee Loevinger's "The Paradox of Knowledge" is nothing of the sort. By the usual definitions (which are admittedly fuzzy and subject to dispute) *knowledge* and *ignorance* are complementary. The more of the one, the less of the other, inasmuch as they can be quantified (a perilous enterprise). So in the commonsense view, as our collective knowledge of a particular subject increases, our ignorance of it decreases. And I see no reason to abandon that view; it is a healthy one. Loevinger's thesis that "as knowledge about nature expands, so does ignorance, and ignorance may increase more than its related knowledge," printed in very bold letters, can lead, if accepted, to Pyrrhonism or absolute skepticism—a very unhealthy epistemological position.

Now, his thesis can very well apply to *perceived* knowledge and *perceived* ignorance, which is what, in fact, generally has been happening in scientific circles in the last hundred years or so—with the exception of the overoptimistic believers in a "theory of everything" or a "final theory." But it doesn't help matters to confuse perceived with actual knowledge and ignorance. Socrates understood that distinction when he supposedly stated, tongue-in-cheek, that all he knew was that he knew nothing.

And, if one thinks of all there is and happens in space-time (and out of it?) as infinite, which is not unreasonable, then, of course, our ignorance is unlimited in principle and our possible knowledge relatively infinitesimal. But that doesn't mean our ignorance would increase with our increasing knowledge. Thus, there's no paradox and we can get on with scientific inquiry with some confidence in its usefulness. . . .

That being said, the main merit of Loevinger's article should be pointed out: It calls for discussion, for criticism—the very spirit of skepticism.

Georges Delacre
Falls Church, Va.

*SI*'s September/October 1995 issue was excellent cover-to-cover, with an interesting range of topics and a engaging variety of treatments—altogether superb.

Regarding Lee Loevinger's "The Paradox of Knowledge," a parallel might be worthy of mention. The late Isaac Asimov, author of 400-plus books on science and almost everything else, wrote of his own hypothesis that knowledge itself might be, or have, aspects one might characterize as "fractal."

Asimov mentioned this idea to his friend, the physicist Heinz R. Pagels, author of *The Cosmic Code: Quantum Physics and the Language of Nature*, and *Perfect Symmetry: The Search for the Beginning of Time*. Pagels expressed interest in, and decided to do some math toward, a proof of this hypothesis, perhaps as an extension of his work on complexity, but he died in 1988 in a tragic fall, leaving his calculations unfinished. Asimov reported this in an editorial in Asimov's *Science Fiction* magazine at the time Pagels died. One wonders if anyone else might like to take up the challenge.

"Consciousness as a Valid Subject for Scientific Investigation," by Huntley Ingalls (*SI*, September/October 1995) was better than most articles on that topic and not really that difficult a read, either. Keep up the fine work.

Gene Stewart
HQ/USAFE/IM
APO/AE

Reading "The Paradox of Knowledge" by Lee Loevinger reminded me of a quote from French author Jules Sageret: "The greater becomes the volume of our sphere of knowledge, the greater also becomes its surface of contact with the unknown." Fortunately, as the radius of the sphere increases, the surface-to-volume ratio decreases to zero, in the limit, so that eventually knowledge will triumph, relatively speaking.

Didier de Fontaine
Professor of Materials Science
University of California
Berkeley
Berkeley, Calif.

I enjoyed Lee Loevinger's "The Paradox of Knowledge" but was surprised he made no mention of the 1977 book, *The Encyclopaedia of Ignorance*. This compendium of articles, from mostly U.K. scientists, explicates the many areas of knowledge that we know little or nothing about. The editorial preface says it well: "Compared to the pond of knowledge, our ignorance remains Atlantic. Indeed the horizon of the unknown recedes as we approach it." When the editors asked respected scientists to contribute to this volume, it was

noted that, "The more eminent they were, the more ready [they were] to run to us with their ignorance." Maybe as we know more about the darkness that surrounds the light of human knowledge, the better we become at articulating where to go next.

Terry Sandbek
Sacramento, Calif.

## Consciousness as a Subject for Science

In *SI*, September/October 1995, Huntley Ingalls ("Consciousness as a Valid Subject for Scientific Investigation") was allowed to perpetuate some of the usual misinformation regarding the study of our consciousness from the point of view of behavioral psychology and this "hot" topic in general.

For one thing, the author seems to think behaviorists have nothing to say about consciousness. Hardly! Consciousness is not something a person "has"; it is something a person "does." Consciousness is behavior; it is and has been the subject matter of behavioral psychology for decades. Consciousness is a behavior of observations made of one's own behaviors, some of which are only observable by ourselves. On the other hand, some of our behaviors are more reliably observed by another observer.

When it is argued that the Neuroscience Conference proceedings devoted to consciousness represent a scientific advancement, I have to question that, since various participants at that conference argued over the nature of "mind," God, black holes, and the uncertainty principle. Musing about and chasing our tails over the same topics that Plato wrote about makes it clear how far we haven't come.

Brady J. Phelps
Department of Psychology
South Dakota State Univ.
Brookings, S.D.

In the first paragraph of "Consciousness as a Valid Subject for Scientific Investigation," Huntley Ingalls erroneously but clearly implies that there is only one variety of behaviorism. This is false. The variety of behaviorism to which Ingalls seems to refer is methodological behaviorism that "holds that only phenomena that can be objectively observed are proper subjects for scientific study." In contrast, radical behaviorism, identified with B. F. Skinner, includes in its domain the processes occurring inside our skins that we subjectively experience. For radical behaviorists the important questions concerning these subjective experiences have to do with their origins, their nature, and the role, if any, that they play in the determination of overt behavior.

But Ingalls should not feel particularly bad about this mistake; psychology textbook writers have been making the same mistake for decades.

P. A. Lamal
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Charlotte, N.C.

Huntley Ingalls refers to the failure to distinguish between form and content, particularized as the failure to distinguish between simulation of consciousness and duplication of consciousness, as the "fundamental problem" of strong AI [artificial intelligence]. He presents digestion as an analogous process (among others) to consciousness. He points out that simulations of digestion are not duplications of digestion. I can't disagree that simulations of digestion do not digest, but I question the relevance of the analogy.

For the process of digestion, the "content" is food; nothing can claim to duplicate digestion unless it processes real food. And since a computer simulation of digestion processes an *abstract representation* of food rather than the food itself, it doesn't qualify as a duplication.

But what is the content, the "food" of consciousness? Abstract representations! A "simulation" of consciousness does indeed deal with the same "content" as does consciousness itself: pure information, an entity which, by virtue of its abstract nature, exists independently of any particular physical instantiation. If a simulation of consciousness is processing idea X in the same manner as a genuinely conscious being processing idea X, they *both* are simply processing idea X in that manner, and I don't see how a distinction can be made between the real process and the simulation. It is of crucial importance that the content of consciousness does not consist of physical substance, such as food.

So, simulations of consciousness would appear to qualify (at least in this regard) as duplications of consciousness because the nature of the "content" of consciousness erases the simulation/duplication distinction and analogies to other simulations that do not erase this distinction can only mislead.

Simulations "think about" a process rather than try to duplicate it, and it is true that this is normally an essential distinction. But when the simulated process is *thought itself*, what's the difference?

If this is the fundamental problem of strong AI, perhaps there's a strong case to be made for it.

Dan Kritchevsky
Evanston, Ill.

After having read Huntley Ingalls's fine article on consciousness, I have a bone to pick. I noticed that no attention was given to the many scientists who still believe that there is no such thing as consciousness. It seems as if Ingalls makes the assumption that the old view has been discredited. This is certainly an opinion, but not a fact; and it seems to me that the existence of consciousness should be doubted until it is proven. Surely *SI* believes that the existence of psi should be doubted until *it* is proven. Why should consciousness be treated any differently?

To date, as far as I know, there has been no replicable experiment demonstrating the existence of consciousness. There likely will never be one because *consciousness* is just a word. There is simply *nothing* to prove. A perfectly sound, materialistic, and parsimonious explanation for every human behavior either observed or experienced can be given without having to conjure up any consciousness. Consciousness is the ether of the nineties!

Explanations of human behavior and experience based on physics, math, or computer sciences should often be questioned. They have been used as metaphors by every paranormal quack for the last hundred years. Don't believe them. The

proper fields for explanation of human behavior are biology and behavioral science. Metaphors from biology are much more likely to be accurate since we are biological beings. Explanations for our actions and experiences are much more likely to be true if they rely on sound biological principles such as natural selection. I suggest, for all you disappointed skeptics out there, a materialistic, natural selection-based explanation of any complex behavior we might call "consciousness" can be found in Donahoe, J. W., and D. C. Palmer, 1994, *Learning and Complex Behavior,* Needham Heights, Mass.: Allyn and Bacon. Such explanations, and texts about them, get little press. They make no grandiose claims like *Consciousness Explained* [cited by Ingalls], and are far less interesting than Turing machines, Strong AI, or self-referential systems. They merely methodically explain behavior and experience without reliance on creators or mentalism. The scientific field to which Donohoe's text is a part is called "Behavior Analysis" and it gets far too little attention in your fine journal.

David C. Richwerger
Sacramento, Calif.

## African-American Baseline Essays

Finally scholars are starting to pay attention to the materials used in African-American curricula in a growing number of public school systems. Walter F. Rowe's lucid critique ("School Daze: A Critical Review of the 'African-American Baseline Essays' for Science and Mathematics," *SI,* September/October 1995) of two such source documents for teachers confirms what some parents have feared, but have been reluctant to assert: These curricula may be politically correct but historically false.

Instilling a sense of positive self-image in children ("self-empowerment" is the current catchphrase) is an important goal for many school systems, particularly those in poor urban areas. However, the attempt by some researchers and educators to appropriate historical achievements to a particular race will eventually do little to achieve this end. At best it will disadvantage students by providing an incorrect and occasionally bizarre view of history. At worst it may eventually *harm* a student's sense of self-worth. Many of these students will eventually have to ask themselves why their teachers thought it was necessary to create an insupportable set of "African" achievements. Are the histories of these peoples so embarrassing that they need augmentation?

Sadly, this is all unnecessary. Surely the unprecedented advancement of African-Americans in past 125 years alone provides a cornucopia of lessons and role models that are closer to home and, more important, historically accurate.

Marcus Peacock
Washington, D.C.

I would like to add a few lines to "School Daze." I am glad the "African-American Baseline Essays" have been brought to task in *SI.*

Still, I cannot help but wish that the author had pointed out that, as I believe, the true tragedy of this series is that it substitutes a fantasy for the *real* accomplishments of sub-Saharan Africans and the deep and respectable heritage of their descendants.

The arts, culture, agriculture, architecture (Great Zimbabwe) and, yes, the science (especially astronomy and medicine) were as advanced in many places on that part of the continent as any in Europe before colonization and subjugation began. There is no reason that they would not have advanced apace had that interference not occurred. No African-American needs any pretense to be proud of who he or she is.

Gerald H. Morris
Los Osos, Calif.

I would like to contribute a brief addendum to the discussion of the Ishango bone in Walter Rowe's article, "School Daze."

It is true that the *initial* excavation by Jean de Heinzelin in the 1950s provided a date of 6500 B.C. for this unusual artifact; see de Heinzelin's article, "Ishango," in *Scientific American,* 206 (1962): 105-116. However, more recent work has established a date of 20,000-25,000 years B.P. for the bone; see, for example, Alison S. Brooks and Catherine C. Smith, "Ishango Revisited: New Age Determinations and Cultural Interpretations," *African Archaeological Review* 5 (1987): 65-78. It is, therefore, one of the oldest artifacts of its kind.

In his article, de Heinzelin offers some speculations about the markings on the bone; for example, he observed that one series of notches can be interpreted as representing the prime numbers between 10 and 20. I do not find the current evidence convincing that this early lakeside culture had such mathematical sophistication, but the Ishango bone provides material for interesting hypotheses.

There is also a discussion of the Ishango bone in George Gherverghese Joseph's *The Crest of the Peacock: Non-European Roots of Mathematics.* This is a relatively sober account of the contributions non-Western cultures have made to mathematics.

Jeffrey Shallit
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University of Waterloo
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Canada

I was horrified to open the latest SKEPTICAL INQUIRER and discover an ugly racist caricature on page 28 in connection with the article on the "African-American Baseline Essays." I have no quarrel with Walter Rowe's article, but the accompanying figure by Gerald Fried is vicious. I cannot imagine how any reader of the SKEPTICAL INQUIRER could bear to show such a picture—even in its context—to an African-American friend. Surely your African-American readers will be dismayed.

If the editorial board of SKEPTICAL INQUIRER does not, in its next issue, publish an unqualified apology for this hideous mistake, then I will cancel my subscription, cease my donations to CSICOP, and denounce the organization as racist in any situation where the name of CSICOP is invoked.

William J. Knight
South Bend, Ind.

I was shocked by the tone of the article by Walter F. Rowe, "School Daze: A Critical Review of 'African-American Baseline Essays.'" Taken in conjunction with the accompanying cartoon illustration on

page 28, the article is profoundly and depressingly racist. I am therefore sadly asking you to cancel my subscription to the SKEPTICAL INQUIRER

Jeremiah M. Gelles, M.D.
Brooklyn, N.Y.

*Editor's reply:*

*Two other readers also wrote to protest the illustration, the article, or both (we have answered each personally). The article is a straightforward, critical analysis of an important issue. As for the drawing, it was not intended to be a caricature but a depiction of one of the main points under criticism: the Afrocentric assertion—against the preponderance of evidence—that the ancient Egyptians were sub-Saharan African. Nevertheless, perceptions are important, and we are sorry if the illustration caused any offense. By the way, Beatrice Lumpkin, author of the mathematics essay, has asked for space to reply, and we have granted it, in a future issue.*

*—Kendrick Frazier*

## Mystical Medical Alternativism

"Mystical Medical Alternativism" by Jack Raso (*SI*, September/October 1995) simultaneously struck my funnybone and my memory button. Rudyard Kipling's "Our Fathers of Old" may brighten your day, especially stanza three [below] which seemed particularly apropos to Raso's article.

*Wonderful little, when all is said,*
*Wonderful little our fathers knew.*
*Half their remedies cured you dead—*
*Most of their teaching was quite untrue—*
*"Look at the stars when a patient is ill.*
*(Dirt has nothing to do with disease),*
*Bleed and blister as much as you will,*
*Blister and bleed him as oft as you please."*
*Whence enormous and manifold*
*Errors were made by our fathers of old.*

—Rudyard Kipling

Ed Shields
Meridian, Miss.

## Science Without Adjectives

In "Science Without Adjectives" (*SI*, September/October 1995) Ralph Estling states that "Konrad Lorenz (German-Austrian Nobel laureate in physiology/medicine) . . . had nice things to say about Nazism. . . ." Professor Lorenz's own words (in Zeitschrift fur angewandte Psychologie und Charakterkunde, translation from Philippe Aziz's *Doctors of Death*, volume 4, p. 19) are: "For the preservation of the race, we should be attentive to a more severe elimination of morally inferior human beings than is the case today." His article was an exposition of scientific principles, with a call to action, rather than a nationalistic or political statement as Estling implies. Lorenz himself tried to mitigate his culpability by his explanation that "a certain number of . . . scientists of very high reputation believed for a certain time, as I did, that some good would come out of National Socialism." It is this half-truth that Estling peddles to SKEPTICAL INQUIRER readers.

Lorenz was reluctant to talk about the Nazi years. We are luckier in that Professor Ferninand Sauerbruch left us memoirs concerning his experiences during the Nazi regime. I have to guess (since a reference is not provided) that the story of the Brownshirted stormtrooper in the mid-1930s, who interrupted a medical lecture and received a curt rebuke from Sauerbruch, came from these memoirs. Michael Kater characterizes Sauerbruch's memoirs as "generally unreliable" (*Doctors under Hitler*, p. 324). Many Germans tried to sanitize their years during the Nazi regime; Sauerbruch was no exception. Am I saying that I think that SKEPTICAL INQUIRER has published an article with statements that are as hard to check out and have about as much validity as Mack's UFO abduction stories the magazine complains about? Yes.

The fact is that "Professor Sauerbruch, the surgeon, . . . took a public vow to support Hitler and the National Socialist regime" (Shirer, *Rise and Fall of the Third Reich*, p. 251, and, later, Robert Jay Lifton, in *The Nazi Doctors*, p. 37). Christian Pross (in "Nazi Doctors, German Medicine, and Historical Truth," Chapter 3 in Annas and Grodini's *The Nazi Doctors and the Nuremberg Code*, p. 40), notes that "trial documents . . . charged Ferninand Sauerbruch, Germany's leading surgeon, . . . with being accessor(y) to medical crimes by participating in a conference on the extremely cruel and partly fatal sulfonamide experiments in Ravensbruck." Kater concluded that Sauerbruch "lived 'in qualified agreement' with the Nazi state 'albeit vacillating.'"

Bradley K. Evans
Traverse City, Mich.

## China, Chi, and Chicanery

Peter Huston's overview of traditional Chinese medicine ("China, Chi, and Chicanery," September/October 1995) is useful, but it shows how even a careful observer like Huston can be had. Huston accepts and repeats the false assertions about acupuncture and anesthesia, including the legend of James Reston of the *New York Times*.

Contrary to the legend, James Reston's appendix was removed with conventional anesthesia, not with acupuncture. The next day Reston was beset with gas pains, common after appendectomies, and happened to inquire about acupuncture. By way of demonstration, they stuck him with acupuncture needles and his gas pains got better, which would have happened had he used acupuncture, fondled voodoo dolls, or bayed at the moon. As for the woman in the Moyers television series having surgery while awake and getting acupuncture, I too watched this sequence on television and I noticed that the patient had an IV hooked to her. What do you suppose was in that IV? Chicken soup?

Similarly, when the Moyers series showed medicines being dispensed to the faithful, I noticed that, along with the herbs and dried lizards, conventional medicines like antibiotics were also given. Do we have to guess which were effective?

Huston mentions the "gate theory" in an attempt to make scientific sense of the alleged (and unproved) pain-relieving capability of acupuncture. But the well-established effects of placebos and counter-irritants provide sufficient explanation. The gate theory, with its questionable relevance to acupuncture, is not necessary.

We have instruments sensitive enough to detect transmissions from outer space, but our instruments have not been able to detect acupuncture meridians or Chi. I

doubt if the ancient wise men had more sensitive instruments. Chi, and meridians, were *guesses* by these wise men about how the body worked. I'll bet if they were somehow transferred to today's world and given access to modern information, they would toss away their ancient theories in a trice.

Marvin J. Schissel, D.D.S.
New York Chapter
National Council Against
Health Fraud
Woodhaven, N.Y.

Peter Huston, in "China, Chi, and Chicanery," misses a good opportunity to criticize traditional Chinese medicine on the grounds that it encourages illegal trade in endangered species. Tiger parts, bear gall bladders, rhinoceros horn, and many other items of dubious efficacy derived from endangered species, are available on the black market for medicinal use. The use of some items is based on the principle of sympathetic magic: Like produces like. If something is shaped like a penis it is bound to be useful for impotency. In addition, the more money spent on a remedy, the better it must be.

Not all traditional Chinese remedies are useless though. They should not be dismissed until controlled trials tell us what's effective and what's not. For example, the herb *Artemisia annua,* annual wormwood, has been used for centuries by the Chinese to treat malaria. Scientists have isolated the active ingredient and are now working on a more potent chemical derivative. This is a welcome development in places where the malaria parasite has become resistant to traditional Western medicine in only a century or so of use.

As Huston concludes, further study of Chinese and other traditional medical systems will reveal much that is useful to the rest of the world. We can't dismiss the totality because some parts fail to conform to our ideas about medicine. However, the practice of illegally harvesting endangered species to enhance the sex life of rich believers should be condemned. It is harder to criticize mothers with sick babies, but mothers are pragmatic and will turn to less destructive remedies if they are shown to be more effective, cheaper, and readily available.

Carol Hayman
Austin, Texas

## Fuzzy Logic

As usual, Martin Gardner ("Fuzzy Logic," *SI,* September/October 1995) has an unerring instinct—or a highly trained mind—to identify amphigory even in the hallowed halls of science.

I have used Bart Kosko's technical book *Neural Networks and Fuzzy Systems* as the text for a graduate course on "advanced methods" for signal processing and found it clear, concise, and quite useful, as it contains a valuable summary of the various "neural network" models and a good exposition of fuzzy sets, including Kosko's own contributions to the field.

However, as I was careful to warn my students, there are places in the book where Kosko leaves the realm of science and reason to conduct a personal vendetta against benighted practitioners of "Western logic" and, in particular, the Aristotelian principles of reason. Kosko forgets that fuzzy logic was created to allow a consistent mathematical treatment of fuzzy and ambiguous *linguistic* terms, not objective behaviors of physical reality. Indeed, quantum electrodynamics has shown us that the physical reality is crisp at least to a part in $10^{16}$—not even remotely fuzzy on a human scale. So much for the fuzziness (impreciseness) of quantum phenomena.

Chapter 7 (Fuzziness versus Probability) is the key chapter in Kosko's book as it serves both as a misguided polemic against reason and logic in science and provides a reasonably clear discussion of Kosko's two main contributions mentioned by Martin Gardner (the geometry of fuzzy sets and the fuzzy entropy theorem). A careful reading of this chapter, keeping in mind that fuzzy logic is a description of linguistic behavior, quickly reveals numerous inconsistencies and nonsensical statements. The latter are easy to rectify by applying a little common sense. For example, his Figure 7.1 shows a crude sketch of what might be an oval or an ellipse. Kosko wants us to accept that either "It is probably an ellipse" or "It is a fuzzy ellipse." This false dichotomy, directed against probability theory, which he rightly contrasts to fuzzy logic, is easily resolved by allowing more linguistically diverse statements, such as, "It is a poor representation of a circle," or "it is my shaky sketch of an egg," or any of a number of other statements that attempt to convey, in linguistic terms, the possible interpretations of a picture to a human mind. His wavering circle does not compel us to adopt the fuzzy metaphor.

The telling point against Kosko's anti-Western and antirational polemic against "crisp" logic is very simple and quite devastating: Each theorem proven in his book, including the fuzzy set theorems, makes a fundamental appeal to the Aristotelian laws of logic—those of identity, noncontradiction, and the excluded middle that he so despises! In essence, in denying that A = A, he no longer has the right to use the word "is"; and the famous "Q.E.D." following his proofs of theorems can having no meaning. Likewise, the very structure of a mathematical proof is grounded in the law of non contradiction, and the essence of mathematical consistency is tightly bound with the law of the excluded middle. Thus Kosko has himself denied the validity of his own work.

Concisely stated, *fuzzy logic does not and cannot violate the laws of ordinary logic!* It merely allows a consistent way to express linguistic concepts in a "machine" or computer environment. As such, it is a wonderfully useful tool that can enlighten our understanding of linguistics and make computers much more useful to humans, but it has nothing to say about objective reality apart from the human mind and its cultural concepts.

Anytime someone starts talking about "Western science" in contrast to "Eastern science" or some other putative science, the alarm bells start to ring. There is only science. There may be personal approaches, or flavors, to doing, thinking about, expressing, and reporting science, but there can be only science. It is not Western, not Eastern, not African, not northern European, neither male nor female, not socialist, nor communist, nor bourgeois, nor proletarian; science transcends all ethnic, racial, religious, economic, and philosophical strife that so divides our modern world. As such, science becomes an archetype that has the potential to heal our painful rifts of diversity. Fuzzy logic and fuzzy sets do us poor service when used to widen these rifts.

William Dress
Knoxville, Tenn.

In his column "Fuzzy Logic," Martin Gardner demonstrates his finely honed talent for overgeneralizing when he states: "Zadeh passionately believes that Aristotelian black-and-white logic is useless for reasoning about the real world. This view is shared by Alfred Korzybski, founder of *general semantics,* although this earlier movement by Korzybski had no influence on Zadeh" (p. 10).

Throughout his career Gardner has misrepresented Korzybski's work. Korzybski *did not* consider Aristotelian black-and-white logic useless, only limited. Discussing an either-or orientation, Korzybski wrote, "In living, many issues are not so sharp, and therefore a *system which posits the general sharpness of 'either-or,' and so objectifies 'kind,'* is unduly limited; it must be revised and made more flexible in terms of 'degree'" (*Science and Sanity,* Fifth Edition). Zadeh, I believe, shares this viewpoint.

Gardner does accurately note that Korzybski's work had no direct influence on Zadeh when he started his work. However, I happily report that connections between general semantics and fuzzy logic have begun to be made. Zadeh presented the 1994 Alfred Korzybski Memorial Lecture and participated in the colloquium on "Exploring Life Applications of Fuzzy Logic." Some materials from these events were to be published in late 1995 in the Institute's *General Semantics Bulletin,* Number 62.

I conclude by noting Gardner's careless disregard for the difference between label and actuality. He first writes that "It [fuzzy logic] has been called a 'cult,' with Zadeh as founder and guru" (p. 11). Later in that paragraph Gardner writes that "Michael Arbib suggests that *the cult* [my emphasis] would never have arisen. . . ." From being called a cult, fuzzy logic becomes a "cult." I find this curiously irresponsible formulating from someone touted as a premier "skeptic."

Bruce I. Kodish
Baltimore, Md.

## Reich: One Positive Contribution

I offer some brief comments in connection with Henry Bauer's review of *Beyond Psychology* (*SI,* September/October 1995). Bauer seems to me quite right in his dismissive comments about Wilhelm Reich's bion theory. Some respectable biologists worked with Reich at different times, but as far as I know, no one ever published any study confirming Reich's claims.

However, Bauer does not do justice to what I (and I am sure many others familiar with the facts) regard as major contributions by Reich. Early in the article, Bauer observes that "Reich's insights into character development and the relation of somatic to psychological tension are still drawn upon."

I wish that this were so. I fear that very few people still "draw upon" Reich's work in this area. Freudian analysts and most other psychiatrists know nothing about it or simply don't understand it. If Reich had done nothing more than discover methods, chiefly physiological, for freeing patients from such repressed emotions as rage and disgust, to take just two examples, he would deserve an honored place in history.

Paradoxically, during the very period when Reich seemed to be going off the deep end with the bion theory, he was also working out his new therapeutic technique. When I wrote the article on Reich for the *Encyclopedia of Philosophy,* I obtained all the volumes of Reich's journal published in Denmark between 1934 and 1939. They contain many superb discussions of the somatic base of neuroses and the best way of breaking down what Reich called "armoring." Bauer quite fairly calls attention to some of Reich's less appealing qualities. I could have added some more. However, I can testify from personal experience to Reich's warmth, humanity, and kindness.

I have published three pieces on Reich that try to give a balanced account of his work: in Volume 7 of the *Encyclopedia of Philosophy,* in *The Humanist,* (1974, the text of a BBC talk), and in the *Encyclopedia of Unbelief.* I have off-prints of the first two and would be glad to send copies to anyone who requests them by writing me c/o The Department of Philosophy at Brooklyn College, Brooklyn, NY 11210.

Paul Edwards
New York, N.Y.

## Concern Still Valid

If I understand Harry Eagar correctly (*SI,* Letters, September/October 1995), I believe he is making an error in comparing the number of journalists at a critical thinking class to the general population. Eagar is arguing that since journalists make up far fewer than one person in 80, they are over-represented if one student in 80 is a journalist.

But that would be true only if you expected a random distribution of vocations at such classes. Yet such an expectation is not likely realistic because specialized kinds of classes attract specialized kinds of people.

An empirically based expectation would result from learning the vocations of large numbers of people who had attended many similar classes. In the absence of such data, it might even be reasonable to anticipate that the student population would be composed of people who require critical thinking, in large doses, in their daily work. This should include scientists, philosophers, lawyers, and journalists, among others. But the journalists weren't there. J. P. McLaughlin's concern is, in my view, valid.

Morton S. Rapp
Willowdale, Ontario
Canada

## On Disraeli

I was saddened to see Eric Stockton's letter in your September/October 1995 issue.

As a Welshman I do not object to his comment on Lloyd George. As a Jew, however, I do object to his comment on Benjamin Disraeli. Benjamin Disraeli was born in London as was his father before him.

The expression of a belief that a Jew cannot be English has no place in SKEPTICAL INQUIRER.

Michael Zaidner
Loughton, Essex
England

*The letters column is a forum for views on matters raised in previous issues. Letters should be no more than 250 words. Due to the volume of letters, not all can be published. They should be typed double-spaced. Address: Letters to the Editor, SKEPTICAL INQUIRER, 944 Deer Dr. NE, Albuquerque, NM 87122.*

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